

Machine and Tool **BLUE BOOK**

SEPTEMBER 1951

Special Report on Lathes Part 3

Evaluate cutting fluids by understanding metal cutting process

Use of movie camera in setting production standards

Washington News Letter

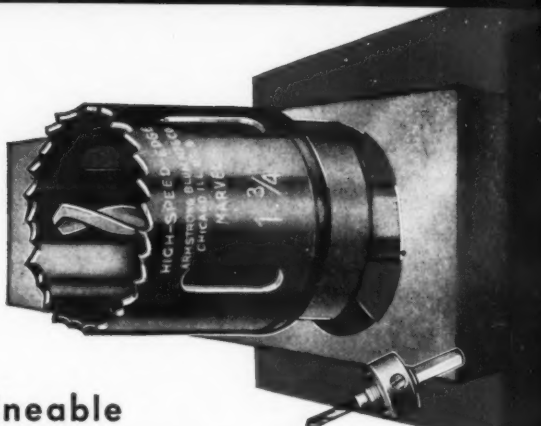
How's Business?

CONTENTS ON PAGE 5

Cut...

LARGE HOLES

... thru any machineable material up to 1 1/8 INCHES thick!



Here is a premium tool which makes it possible to saw holes in one short operation ... large holes which heretofore had to be laboriously machined "a-chip-at-a-time."

MARVEL High-Speed-Edge Hole Saws have strength to withstand the terrific peripheral strains of heavy duty operation in lathes, drill presses or portable power tools. They have a high speed steel cutting edge which is electrically welded to a tough, alloy steel body, high speed steel pilot drills, heavy hexagonal shanked arbors and sufficient set for deep drilling. They are self-aligning, as the larger diameter saws float on their arbors and are driven by double drive pins. They will saw round holes accurately in any machineable material.

MARVEL High Speed-Edge Hole Saws come in 35 sizes, from 3/8" to 4 1/2". They are carried in stock by leading industrial distributors.

WRITE FOR BULLETIN ST-49

"MARVEL" has Always had the edge!

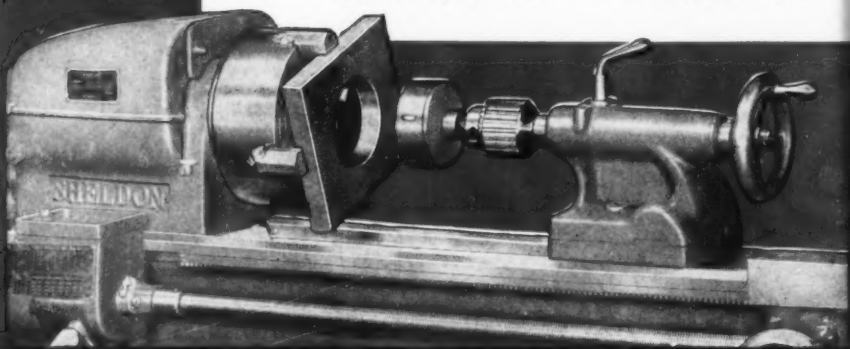
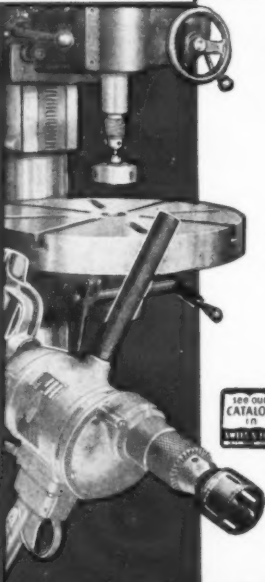


ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

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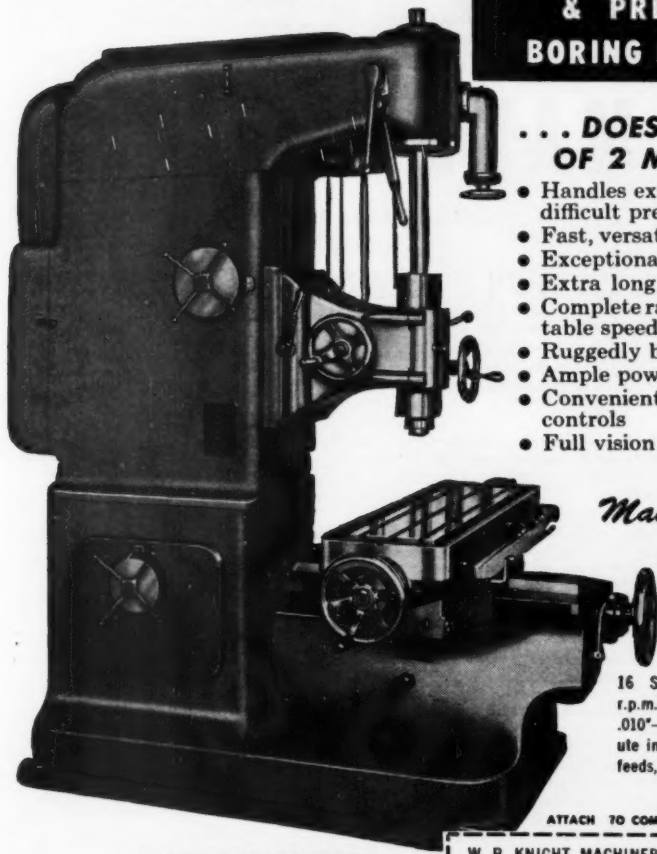
Chicago 39, U. S. A.



✓ CUTS SETUP TIME!

✓ ELIMINATES WORK
TRANSFERS!

KNIGHT
NO. 50
VERTICAL MILLING
& PRECISION
BORING MACHINE



**... DOES THE WORK
OF 2 MACHINES!**

- Handles extreme range of difficult precision work
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- Exceptional cross table travel
- Extra long spindle travel
- Complete range of spindle and table speeds and feeds
- Ruggedly built for accuracy
- Ample power for tough jobs
- Convenient quick-action controls
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NOW!*

16 Spindle speeds, 40 to 2000
r.p.m.—9 Spindle feeds, .0005" to
.010"—100" rapid traverse per min-
ute in both directions—16 Table
feeds, 5/16" to 20" per minute.

ATTACH TO COMPANY LETTERHEAD

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MACHINERY COMPANY



3920 West Pine Blvd.
St. Louis 8, Missouri

W. B. KNIGHT MACHINERY COMPANY
3920 West Pine, St. Louis 8, Mo.
Send catalog on No. 50 and other Knight Milling
Machines.

NAME.....

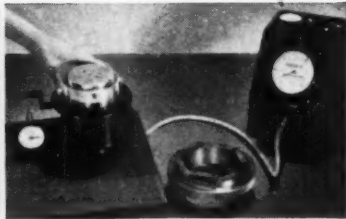
TITLE.....



Model 247B-214 Dial Indicator Gage for checking wall thickness and outside diameter of beer bottles.



Continuous Measuring Gage checks thickness of hard board sheets . . . automatically marks defective areas.



Federal Dimensional Air Gage (range .001" magnification 2500 to 1) used in combination with Dial Indicator.

WE MAKE GAGES!

If you think of us solely as the makers of world-famous Federal Dial Indicators, here are a few points to remember.

DO YOU KNOW that for over twenty years Federal has been making complete gages for controlling dimensions? We make mechanical gages, stock gages, special gages, air gages, electronic gages, electrical gages, automatic gages, sorting gages, portable gages, big gages, little gages.

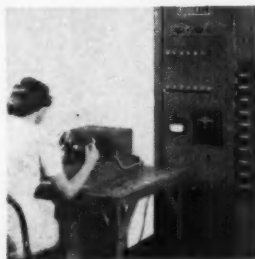
DO YOU KNOW we have over 20,000 gage designs in our engineering files *right now*? Here's one of the greatest storehouses of practical gaging information to be found anywhere.

DO YOU KNOW there's undoubtedly a design in our files that's *right* for your job, requiring the barest minimum of adaptation or special design work? Think of the saving this means to you in time, expense, and experimentation.

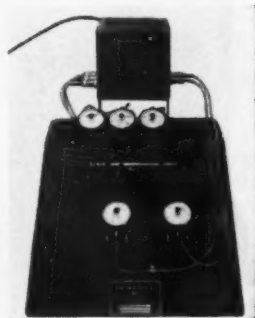
DO YOU KNOW Federal gages work fast, read easily, and reduce operator fatigue because they're backed by experience? For example, the efficient gage we made yesterday for a manufacturer of automotive equipment helps us design and build an efficient gage for *you* tomorrow — whether you manufacture refrigerators or radios, razor blades, or rivets.

DO YOU KNOW our nationwide gage engineering staff is another big reason why so many leading industries come to Federal for Dimensional Gages? They know they can depend on Federal for service, parts, and know-how . . . for on-the-job assistance . . . for help whenever help is needed.

When you have a dimensional control problem, put it up to Federal. For our recommendations, send blueprints indicating dimensions to be checked. No obligation. Also ask for Catalog 61. FEDERAL PRODUCTS CORPORATION, 1259 Eddy Street, Providence 1, Rhode Island.



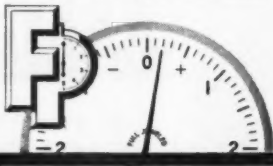
Electronic Gage automatically sorts mica sheets into correct thickness categories.



Electrator Gage for high-speed inspection of many dimensions simultaneously.

FEDERAL

Largest manufacturer devoted exclusively to designing and manufacturing all types of DIMENSIONAL INDICATING GAGES



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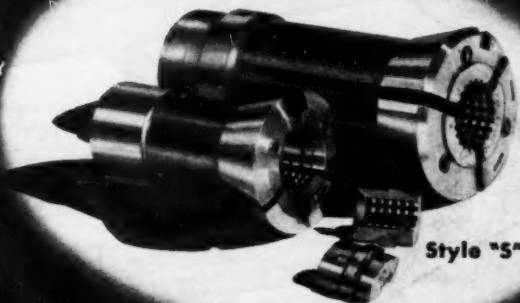
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Available for all sizes
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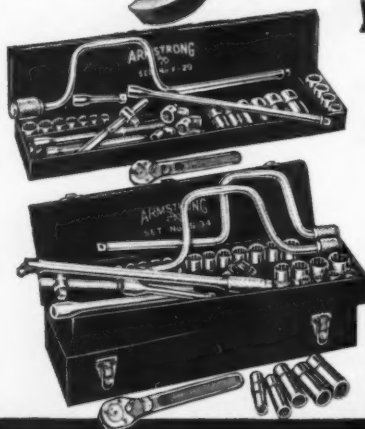


Choose Your Wrenches as you do your friends--for life

Specify ARMSTRONG Wrenches for lifetime service, for finely balanced tools that feel right in the hand and make work easier, faster and less fatiguing. ARMSTRONG Wrenches generally are longer for size—give greater leverage. Accurately milled or broached openings give the proper clearance. They are safe wrenches because they are strong beyond need.

Drop forged and machined from high tensile carbon or special alloy tool steels, ARMSTRONG Wrenches are heat treated, tempered and tested to an exact balance of toughness, hardness and tensile strength. Each is beautiful in finish and line, is a quality tool to be proudly possessed by any mechanic—or certain to "give a lift" to any assembly line. Buy wrenches which carry the trade marks HI-TEN or ARMALLOY. On carbon or alloy steel wrenches these trade marks are your guarantee of lifetime quality.

WRITE FOR CATALOG



ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"
5208 W. ARMSTRONG AVENUE CHICAGO 30, ILL.

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Hitchcock district managers are listed on page

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specify **CLEVELAND**

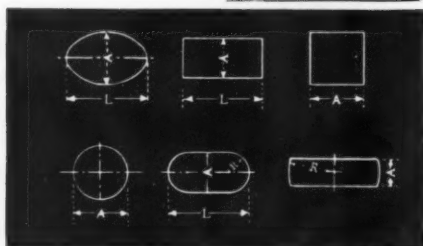
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Prompt shipment from stock of any of the 400 sizes of the standard Round Cleveland Punches and Dies is assured. What's more . . . you save because of quantity stock production.

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Special punches and dies for all these shapes.

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AROUND WHEN WORK CAN'T WAIT**

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**COMPLETE
HONING EQUIPMENT**

**EVERYTHING
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HONING MACHINES

15 sizes, diameters from
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HONING TOOLS

sizes to 50"

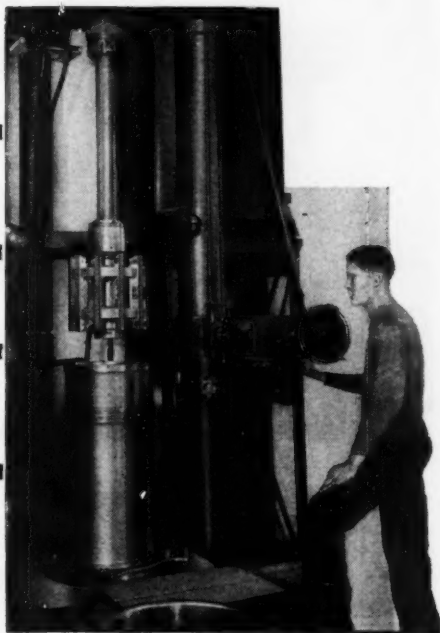
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special purposes

FULMER . . . AND ONLY FULMER . . . can deliver complete honing equipment on any size in one package . . . an advantage which assures savings to open your eyes and increase your profits.

Take stock up faster . . . hone to the most exacting tolerances with amazingly less setting-up and honing time. No unnecessary "gadgets" to make costs soar. Even a novice can learn to operate FULMER HONING MACHINES efficiently in an hour or two.

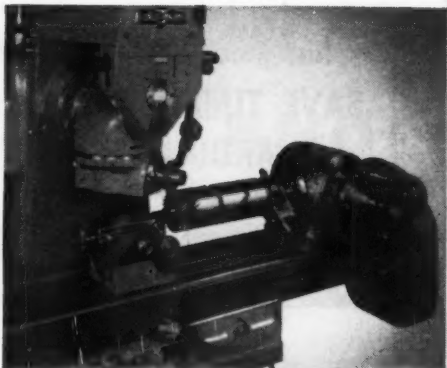
For Quickest and Most Accurate Honing Get Bulletin 10



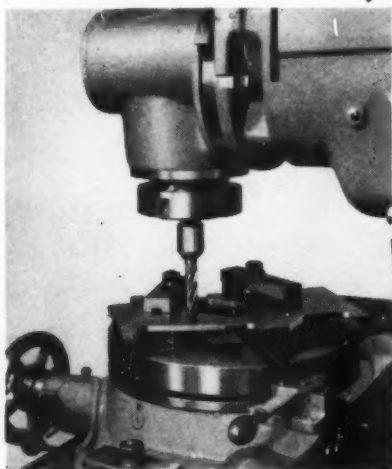
C. ALLEN FULMER CO.

**1242 First National Bank Bldg.
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Universal Spiral Milling Attachment and Dividing Head set up to mill helical teeth on the end of a drum cam. These attachments have an exceptionally wide range of uses. →



Vertical Milling Attachment, with a Quick Change Adapter on its spindle nose, mills a radius in an irregularly shaped part clamped to a Circular Milling Attachment. ↓



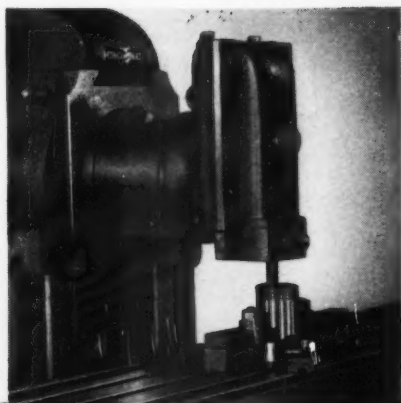
*"For my money a
is tops, but I wish
more extra
(EXCERPT FROM A*

• Cincinnati Milling builds the type of attachments that toolmakers need to turn out their work quickly and safely. A few CINCINNATI attachments are shown here. Individual catalog type literature is available for each. All of them are pictured in attachment circular M-1382-3. May we send a copy to you?

THE CINCINNATI MILLING MACHINE CO. CINCINNATI 9, OHIO

CINCINNATI

MACHINE and TOOL BLUE BOOK

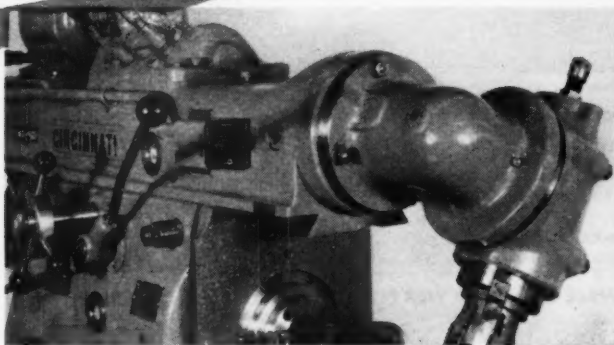


Slotting Attachment has an adjustable stroke of 0 to 4"; may be swiveled 360°

Milling a fixture part held in a No. 5 Plain Vise. Vise jaws may readily be changed to special designs suitable for the work. Swivel, Toolmaker and All-Steel Vises also available.



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our shop had
equipment."*
TOOLMAKER'S LETTER)



Motor Driven Universal Milling Overarm Attachment on a CINCINNATI Dial Type. Always ready to use; convenient for frequent changes in setups.

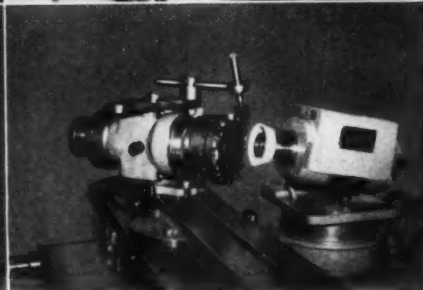
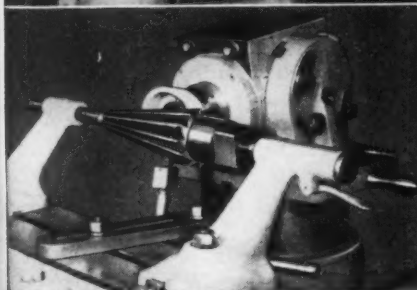
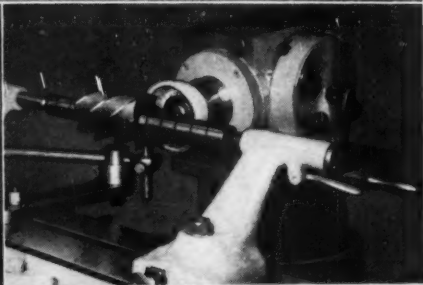
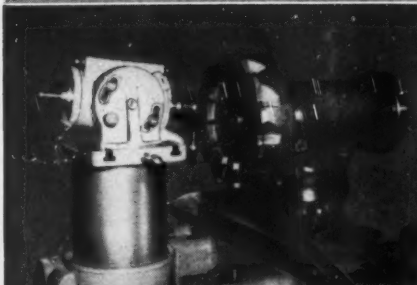


MILLING MACHINES • CUTTER SHARPENING MACHINES
BROACHING MACHINES • FLAME HARDENING MACHINES
OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID

NEW

with new adjustment

This POPE Motorized Tool and Cutter Grinder SPINDLE



Here's one you've always wanted — a totally enclosed, sealed lubrication, super precision 1 HP, 3600 RPM motorized tool and cutter grinding head, mounted on a new bracket that provides *angular adjustment in a vertical plane*.

POPE Spindles have the radial and axial rigidity to make wheels cut faster — spark out

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Make the most of your present grinders. Equip them with this new and better POPE Spindle.

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SPECIFY THIS POPE SPINDLE ON YOUR NEXT TOOL AND CUTTER GRINDER

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POPE MACHINERY CORPORATION

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accurate forming

**on a Cincinnati
solved this
problem**

Note the clean, straight lines of the moldings formed on the shelf by this Cincinnati Press Brake.



Accurate forming paid off in three ways for Bulman Company, manufacturers of steel display shelves.

Trouble had been experienced in maintaining regularity of product. Now the clean, straight line formed from end to end of the shelving permits a perfect match-up of sections, eliminating a costly trim piece.

Better product, with no discards, and one piece completely eliminated, were the results when this Cincinnati Press Brake was installed . . . it was a profitable investment.

Write for Catalog B-2A—a Cincinnati Press Brake may improve your product and reduce your costs.



These outstanding sectional Bulman display shelves fit accurately.
Photo courtesy E. O. Bulman Mfg. Co., Inc., Grand Rapids 2, Michigan.

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CINCINNATI 25, OHIO U.S.A.
SHAPERS - SHEARS - BRAKES

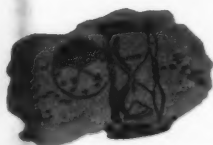




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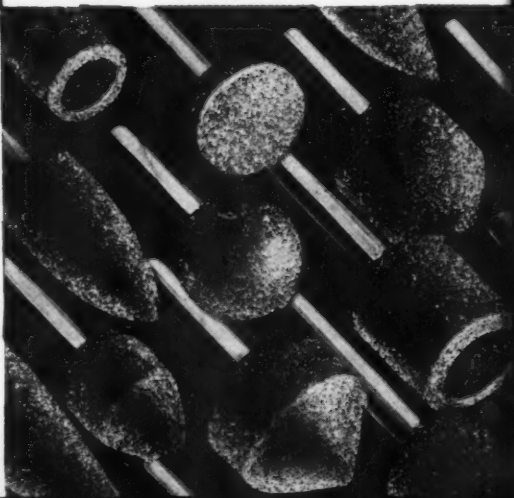


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Chicago Wheel is geared to give you the *fastest possible service*. For better quality, too, it will pay you to **look to Chicago Wheel!**

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TODAY!**



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- ☐ Sample Grinding Wheel

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DISTRIBUTORS IN PRINCIPAL CITIES**

Division of Simonds Saw and Steel Co., Fitchburg, Mass. Other Simonds Companies: Simonds Steel Mills, Lockport, N. Y., Simonds Canada Saw Co., Ltd., Montreal, Que. and Simonds Canada Abrasive Co., Ltd., Arvida, Que.

5 METALS IN PRECISION-MADE REEL MACHINED WITH ONE SUNICUT OIL

The Ocean City Manufacturing Company operates Brown & Sharpe automatics on free-turning brass, aluminum, cold-rolled steel, phosphor and hardware bronze. Having used Sunicut Cutting Oils since 1941 with complete satisfaction, the plant decided a year ago to find out what other products could do. Numerous competitive oils were tested, and the best was selected for a long trial run.

But this oil did not prove satisfactory in actual use. It caused the gibs to corrode and the slides to stick. Operators found miking difficult. Downtime and rejects grew to disturbing proportions. Finally, to protect its automatics and restore its production efficiency, the plant decided to go back to Sunicut Cutting Oils and standardized on Sunicut 11.

Sunicut 11 is a "Job Proved," dual-purpose cutting oil for automatic screw machines. Its transparency permits quick and accurate miking. Among its virtues is the fact it will not stain brass. It drains rapidly, minimizing carry-off. And its high lubricating and cooling properties aid in prolonging tool life and improving finishes. Moreover, it protects finished parts from rust and corrosion. For other outstanding cutting oil case histories write for booklet MT9.



MACHINING PARTS for Ocean City's "90" Automatic Reel. Sunicut 11 does not corrode the bronze gibs of the automatics, minimizes carry-off, makes miking easy. A coolant tried as an "economical" replacement failed on all three counts.



THIS AUTOMATIC REEL contains six types of metals...free-turning brass, aluminum, cold-rolled and stainless steel, phosphor and hardware bronze. Another Sunicut grade is used on the stainless steel.

SUN INDUSTRIAL PRODUCTS

SUN OIL COMPANY, PHILADELPHIA 3, PA. • SUN OIL COMPANY, LTD., TORONTO AND MONTREAL





The game was tied up four to four,
The Toolville crowd was getting sore.
Their favorite pitcher with the "tapered shank"
Gave up three "passes" . . . Brother, how he stank!



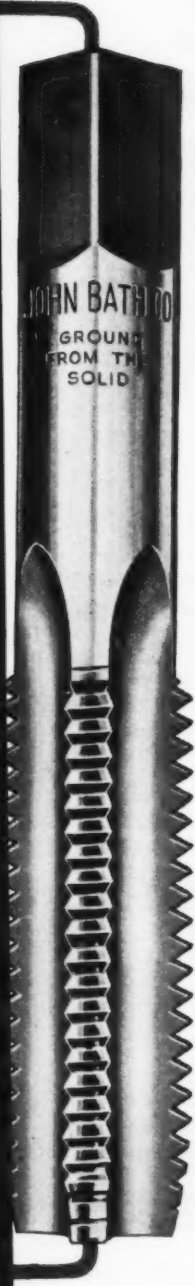
Then came the test for the Bathville team,
And every player was "on the beam".
A perfect "hook" helped every "pitch"
To retire the side "without a hitch".



He was as wild, as wild could be.
Had no control or accuracy.
'Til he "grooved one in" . . . then came a "wham" . . .
And the Bathville boys had a nice "grand slam".



Bath Taps are hardened veterans, all.
In the field they have plenty "on the ball".
They're always ground after being treated —
To give you a season . . . undefeated!



INSIST ON BATH TAPS . . . PROFIT BY THEIR PLUS-PERFORMANCE

You're always "ahead of the game" with Bath ground thread taps . . . because you can depend on controlled uniformity. Every Bath Tap is hardened to full high heat, imparting to the blank the proper hardness and steel structure. No overheating of thin, delicate threads . . . no danger of thread softness by underheating. The finest heat treating equipment allows perfect control of the correct degree of hardness *before the*

threads are ground. The shanks, major and thread diameters and chamfers are ground on centers so that Bath Taps are always concentric.

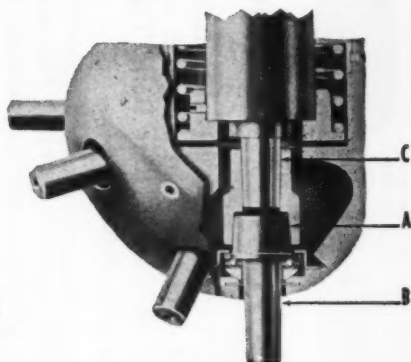
These extra manufacturing features plus rigid quality-control, combine to prove our claims for greater production and better workmanship for Bath Tap users. Let us help with your threading problems.

PLUG AND RING THREAD GAGES • GROUND THREAD TAPS • INTERNAL MICROMETERS

JOHN BATH CO. INCORPORATED
14 Grafton St., Worcester, Mass.

MORE HOLES PER HOUR — PER DOLLAR

Increase production of any standard drilling machine by adding a Lign-o-matic, the only drill turret with the patented, self-centering principle that guarantees sustained accuracy equal to the drilling machine itself.



FOR ALL CONSECUTIVE DRILL PRESS OPERATIONS

PROVED PRODUCTION INCREASE

— Turret indexes faster than tools can be changed or work moved to another spindle. A single Lign-o-matic will release 5 drilling machines for other work and still show increased production and reduced costs on original job.

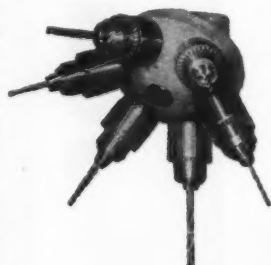
VERSATILITY—Fits any standard drilling machine without altering the machine. Handles operations such as drilling, reaming, counterboring, and tapping (on reversible spindle machines), up to 1/2" diameter in any material.

PRECISION — Patented, self-centering tapered drive (A) automatically locks turret spindle (B) into exact alignment with drilling machine spindle (C) for sustained accuracy.

GUARANTEE — May be returned in 10 days for any reason for full refund of purchase price. Two-year guarantee against defective parts.

PRICE — Model D, 6 spindles with No. 2 Jacobs male taper \$235.00
Chucks extra at established prices.

DELIVERY — Currently, 2 weeks.

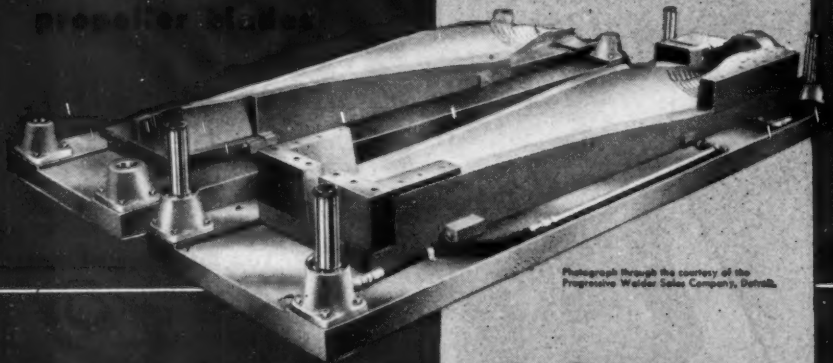


- ☐ Please rush Lign-o-matic turrets for
(drill press make)..... (size).....
(quill dia.)..... (spindle taper).....
My name.....
Title.....
☐ Please send literature on Lign-o-matic turret.
(Attach coupon to company letterhead)

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aircraft
propeller blades



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LONG BEACH CITY 1, 47-28 37th Street
LOS ANGELES 24, Ducommun Metals & Supply Co.,
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MINNEAPOLIS 2, 111 East Wisconsin Avenue
PHILADELPHIA 24, 16 West Chelton Avenue
PITTSBURGH 4, 16 Commercial St.

*Includes complete press

This unique new process takes a previously hot-worked billet and hot forms it into a one-piece hollow steel aircraft propeller. Now, in three steps requiring only a few minutes, a superior propeller is produced that formerly required hours of work.

The development gave rise to the problem of building a special 15 ton die that would provide a quenching action from 1450 degrees in a five minute press cycle.

For a die like this, the diemakers called for...

Reliable Danly precision plus unmatched facilities for the production of standard or special die sets like the one shown here make Danly Die Sets the first choice of diemakers everywhere. A nation-wide system of branch assembly plants* assures prompt, time saving service.

DANLY MACHINE SPECIALTIES, INC.
2100 South Laramie Avenue, Chicago 30, Illinois



PRECISION DIE SETS • STANDARD AND SPECIAL



FROM TOOL TO TONNAGE OF SUPERIOR SERVICE TO THE STAMPING INDUSTRY

LOOK HARD!! YOU WON'T FIND BETTER SHAPES

*Your problems are solved
with the Pedrick
Production
Bender*



For bending pipes, tubes, strips, shapes and bar stock — you may depend on the Pedrick Production Bender for accuracy, uniformity — speed and economy. It is equipped with relay controls for semi-automatic duplicate bending and bends pipe up to 6" extra heavy, has no clamps thus eliminating costly tools — needs no special skill.

Inasmuch as the machine is very inexpensive, the bending cost per piece is very low. If you want to produce quality bending at the lowest possible cost, it will pay you to investigate Pedrick Production Benders.

Write for descriptive folder.

PEDRICK TOOL & MACHINE COMPANY

3640 N. LAWRENCE STREET, PHILADELPHIA 40, PA.

**For Precision
Between Centers**

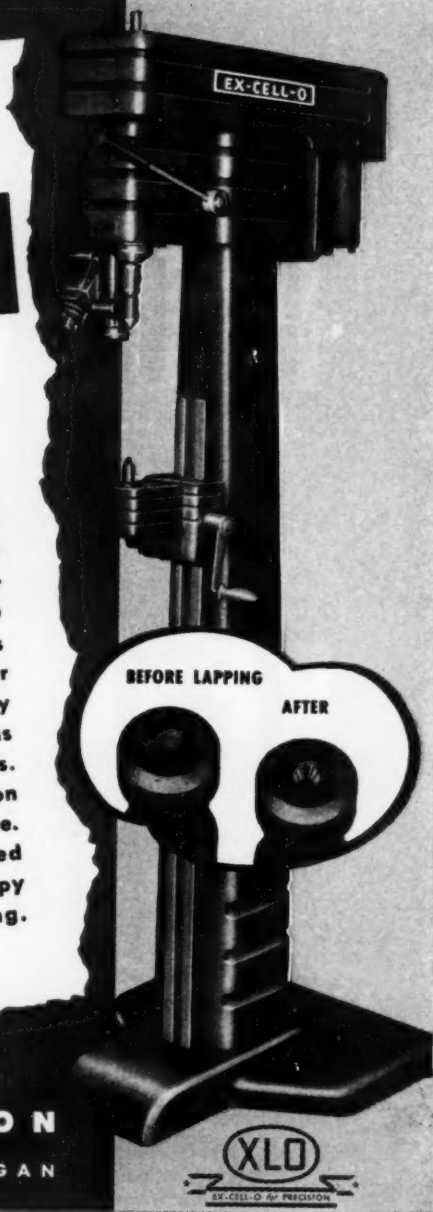
EX-CELL-O

CENTER LAPPING MACHINES

Meeting today's precision standards requires careful checking of every phase of the job, including the center holes in the work. Ex-Cell-O Center Lapping Machines correct inaccuracies of center holes that affect the quality of all subsequent operations performed between centers. These machines are precision built and are easy to operate. They are fully described in Bulletin 40271—a copy is yours for the asking.

**EX-CELL-O
CORPORATION**

DETROIT 32, MICHIGAN



Machine and Tool BLUE BOOK

REaD BOOK

*of the
Metalworking Industry*



OFFICIALS • WORK MANAGERS • PURCHASING AGENTS • SUPERVISORS
SUPERINTENDENTS • ENGINEERS • MASTER MECHANICS • FOREMEN

**Take advantage of this
Economical way of
TRANSMITTING POWER**



S.S.WHITE FLEXIBLE SHAFTS

save parts and cut assembly time and costs

The illustration above demonstrates the economy of using S.S. White flexible shafts to transmit power between parts. The resulting advantages—fewer parts, easier assembly, elimination of alignment problems—mean faster production and lower costs. Combination of S.S. White flexible shaft, casing and end fittings can be supplied in a wide range of capacities—and in practically any length, ready for installation—to meet a wide range of power drive requirements.

WRITE FOR BULLETIN 5008

It contains latest information on flexible shaft selection and application. Write for a copy today.



THE *S.S. White* INDUSTRIAL DIVISION
DENTAL MFG. CO.



Dept. H. 10 East 40th St.
NEW YORK 16, N. Y.

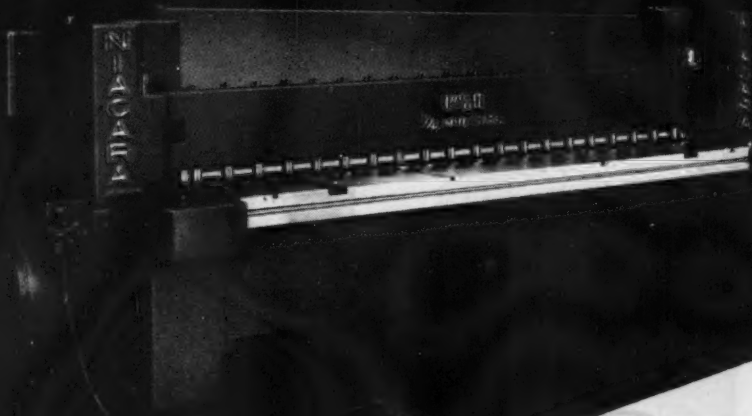
WESTERN DISTRICT OFFICE • TIMES BUILDING • LONG BEACH, CALIFORNIA

NIAGARA

Accuracy in a squaring shear is dependent on rigidity of the shear's components and not upon any individual feature.

Sturdiness, convenience, speed and dependability are the result of experienced engineering and superb manufacture.

Latest type Niagara No. 810 Power Squaring Shear. Arranged with electro-pneumatic tripping device operated by foot switch.



BASIC SHEAR DESIGN

Results in Accurate Cutting



**for Defense
Production**

● **BED, CROSSHEAD, HOLDDOWN and HOUSINGS** in NIAGARA UNDERDRIVE SHEARS are box sections to resist with minimum deflection the horizontal, vertical, diagonal or torsional stresses to which every shear is subjected. No other section will do the job as efficiently. This construction results in extreme strength and rigidity without resorting to deep beam sections which, in the bed, necessarily project below the floor line.

The simple, mechanically operated holddown having individual self compensating pressure feet, performs all required functions of a good holddown efficiently, effectively and quietly without using complex hydraulic circuits, pumps, valves, packings, cylinders, etc. and without generating heat. Maintenance costs are held to a minimum.

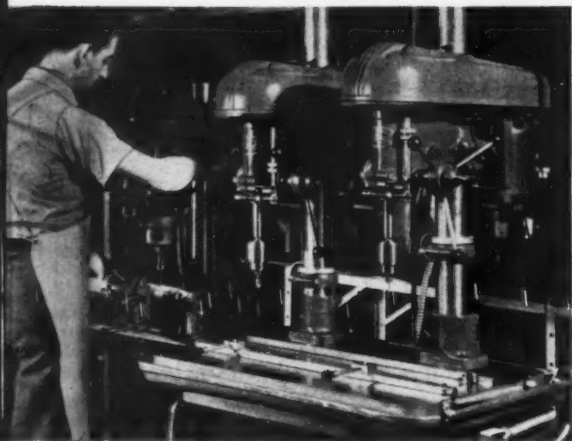
The drive is thru efficient spur gears mounted on anti-friction bearings and running in oil. It employs the famous Niagara 14 point instant engaging sleeve clutch. There are no sliding surfaces such as in worm gears and friction clutches to consume power, generate heat, and to wear rapidly.

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

Manufacturers of Presses, Shears, Machines and Tools for Plate and Sheet Metal Work

DISTRICT OFFICES: DETROIT • CLEVELAND • NEW YORK

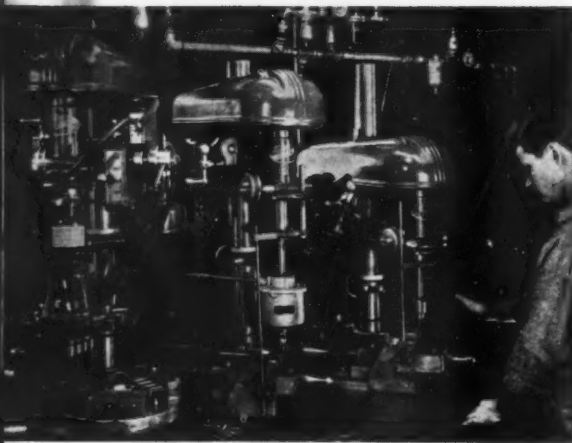
How Delta Tools Solved Four



**TIME SAVING 50%—
PRODUCTION INCREASE 100%**

**ALBERT SPECIALTY CO.,
CHICAGO, ILLINOIS**

When lack of a 3-spindle drilling machine jeopardized vital sub-contracts on aircraft and signal corps equipment, this company combined a Delta 2-spindle unit and a Delta 1-spindle unit for drilling, counter-sinking and tapping six holes in each end of a tube used in a signal corps tripod. A special fixture made it possible to drill the phenolic tubing and brass casting simultaneously with different position limits to make tripods interchangeable. Result—a 50 per cent time saving and production increased 100 per cent over the old method.



**DRILL AND TAP 160 PIECES
PER HOUR**

**EDWARD VALVES, INC.,
EAST CHICAGO, INDIANA**

To increase production speed and reduce labor costs on valve stop collars, Edward Valves, Inc., installed three specially tooled Delta drill presses. Piece is put in machine at right and drilled, manually positioned but automatically clamped by air on drill downstroke. Center machine does tapping operation. Production rate—160 pieces per hour on both operations. Left machine drills valve lubricant screws with 5/32 drill, 500 pieces per hour, with 95% of operation actual machining time, only 5% for loading.

There's a Delta Power Tool for Your Job-

WOOD OR METAL WORKING

53 MACHINES — 246 MODELS — MORE THAN 1300 ACCESSORIES

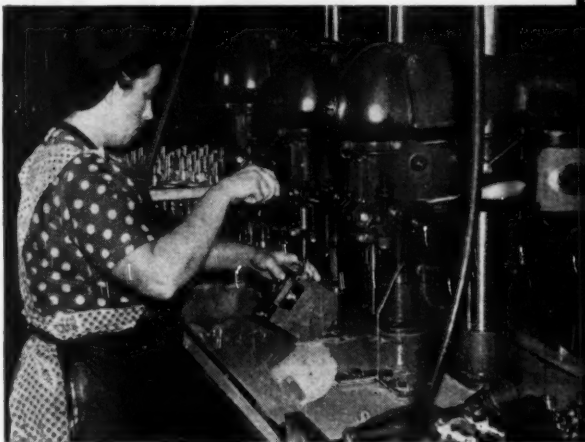
Your Delta dealer is listed in your Classified Phone Directory under "Tools"

Unusual Production Problems

ACCURATE HIGH SPEED DRILLING—NO SCRAP

OHIO BRASS CO.,
MANSFIELD, OHIO

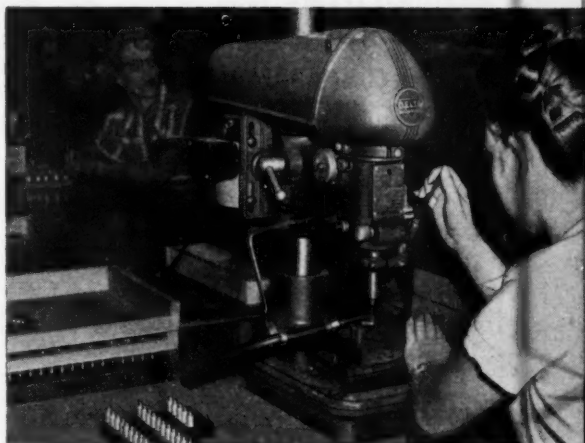
To achieve precision accuracy at a cutting speed of 12000 rpm. in drilling and reaming forged aluminum blanks for fuse components, three Delta super high-speed drill presses were installed in sequence. Blanks are passed from one station to the next, and stops on the table make for quick, accurate positioning. Scrap has been eliminated.



DRILL PHENOLIC PARTS WITH PRECISION ACCURACY

ACRO MANUFACTURING CO.,
COLUMBUS, OHIO

Delta Super-Hi speed drill presses solved three serious problems of drilling phenolic switch parts: (1) formerly drilled four switches to one bit—now drill 150; (2) enlarging holes close to edges of phenolic parts always resulted in 60% scrap because of breakage—with Delta scrap is only 10%; (3) drilling a .004 hole to tolerances of plus or minus .0005 formerly required two operations, drilling from either side. Now with Delta it is done from only one side.



DELTA POWER TOOL DIVISION
Rockwell MANUFACTURING COMPANY

605K E. VIENNA AVENUE • MILWAUKEE 1, WISCONSIN

INCREASE PRODUCTION with *Commander* PRODUCTION TOOLS



You can drill 2 to 8 holes at one stroke of a MULTI-DRILL equipped drill press. Instantly and easily adjusted to any hole pattern... compact in design and ruggedly built for years

Adjustable **MULTI-DRILL**

- ★ DRILLS UP TO 8 HOLES AT 1 STROKE
- ★ ADJUSTABLE TO ANY HOLE PATTERN
- ★ FITS ANY DRILL PRESS

of service, thousands of MULTI-DRILLS are cutting costs and increasing output up to 800% wherever metal, wood or plastics are drilled.

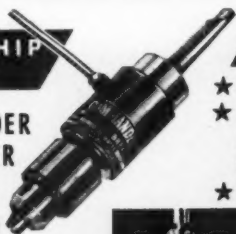
New DRILL CHIP BREAKER

Get these COMMANDER DRILL CHIP BREAKER

benefits now:

- Faster Drilling
- Deeper Holes
- Better Holes
- Longer Drill Life
- Safer, Cleaner Work
- REDUCED DRILLING COSTS

Write for illustrated Circulars on Commander Production Tools. Your nearby Distributor carries the full line—write for his name.



ORDINARY CHIPS

CHIP BREAKER CHIPS

COMMANDER TAPPER

- ★ 1 Tapper Handles Taps #0 to 3/4"
- ★ Automatically Sensitive... Any Operator Can Do Precision Tapping
- ★ Fits ANY Drill Press



Commander Tappers "think for the operator"—automatically stop when taps are dull, overloaded, or when they strike bottom in blind hole tapping—permit faster tapping, better work, even with inexperienced operators. Torque control provides positive tap protection from #0 to 3/4"...spring clutch eliminates slippage, assures smooth, quiet, easy operation.

Commander MANUFACTURING CO.

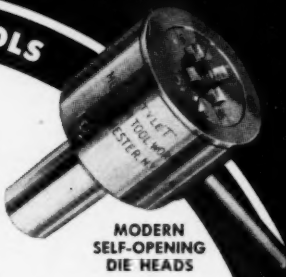
4227 W. KINZIE ST. • CHICAGO 24, ILL.

MODERN PRECISION TOOLS



MODERN
COLLAPSIBLE
TAPS

Modern Self-Opening Die Heads are available in both stationary and rotary types. The stationary type is made in a range of sizes with capacity for cutting straight threads from $\frac{1}{8}$ " to 7", and $\frac{1}{8}$ " to 6" for pipe threads. Rotary type, straight threads from $\frac{1}{8}$ " to $1\frac{1}{4}$ ", pipe threads from $\frac{1}{8}$ " to $\frac{3}{4}$ ".



MODERN
SELF-OPENING
DIE HEADS

Of unusually simple design with a minimum number of parts and no complicated mechanisms, this new Modern Collapsible Tap Style A-A helps meet industry's demand for faster, lower cost production. It is made in a wide range of sizes with adequate capacities for cutting straight threads and straight and taper pipe threads. All parts are of properly hardened steel, ground and precision fitted.

Modern Self-Opening Stud Setters are positive and entirely automatic in action, and can be operated in any position with either air or electrically driven portable tools. Also equally effective in drill presses where it is possible to drill and tap the holes and set the studs in successive operations. Made in two sizes $\frac{1}{2}$ " and $\frac{3}{4}$ " capacity.

Modern-Magic Quick Change Chuck and Collet Equipment virtually eliminates costly idle time usually present in revolving spindle operations. Tools are changed without stopping or even slowing the spindles. Modern-Magic Chucks are made in 6 sizes and two types: friction drive and positive drive. Modern-Magic Collets are available in a broad range of both standard and special types.

Modern Medium Duty Face Milling Cutters are of blade backed design, and are made in axial and radial types. Standard Modern axial type cutters are available in diameters from 4" to 24" Standard radial type cutters from 8" to 24" diameters. All blades, wedges and screws are interchangeable in all Modern Cutters regardless of diameters.

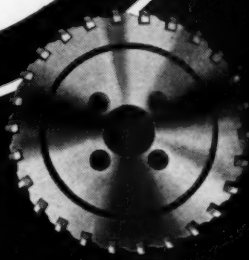
MODERN-MAGIC
CHUCKS AND
COLLET
EQUIPMENT

Detailed information covering any Modern Precision Tool in which you are interested will be furnished promptly upon request. Let us show you how Modern Precision Tools can help to speed up your production and reduce your costs.

Modern Precision Tools
Include
STATIONARY SELF-OPENING
DIE HEADS
ROTARY SELF-OPENING
DIE HEADS
STATIONARY
COLLAPSIBLE TAPS
ROTARY
COLLAPSIBLE TAPS
MODERN-MAGIC
CHUCKS AND COLLETS
SELF-OPENING
STUD SETTERS
INSERTED BLADE
FACE MILLING CUTTERS
SOLID ADJUSTABLE
DIE HEADS
ADJUSTABLE HOLLOW
MILLING TOOLS
UNIVERSAL CHASER
GRINDING FIXTURES



MODERN
SELF-OPENING
STUD SETTERS



MODERN
FACE MILLING CUTTERS

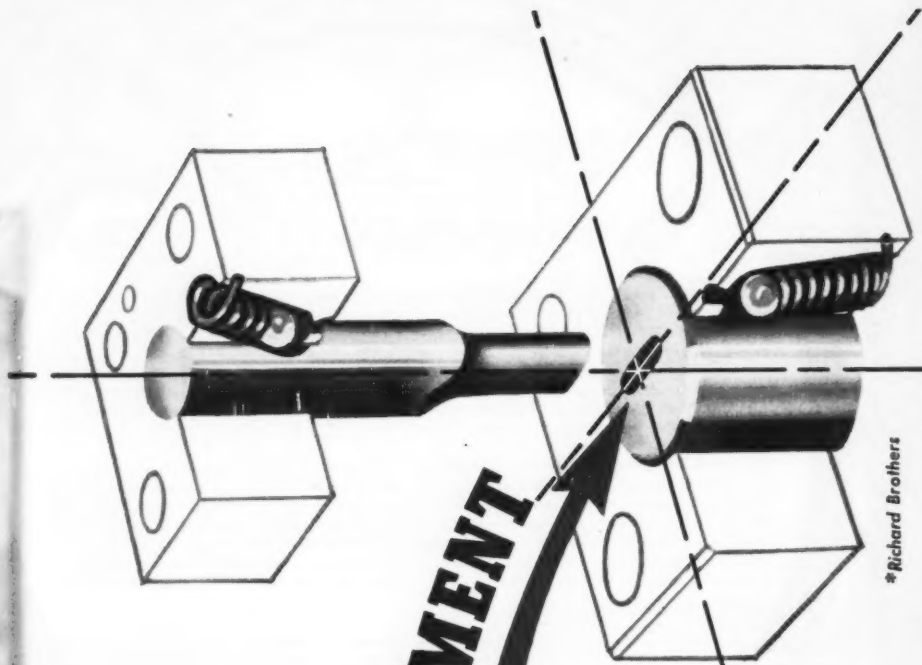
Modern Precision Tools are produced by the originators of the Modern-Magic Quick Change Chuck and Collet Equipment.

MODERN TOOL WORKS

DIVISION OF
CONSOLIDATED MACHINE TOOL CORPORATION
ROCHESTER 10, NEW YORK

POSITIVE ALIGNMENT

in R-B*
Interchangeable
Punches and
Dies



*Richard Brothers

A Stillson wrench might force rotation of R-B punches or dies, but the heaviest of press usage will *never* budge them once they're locked in position. These time-and-money savers are easy to install and remove: just a push, a twist and "Click," the ball locks in the recess on the punch or die button.

The R-B ball lock *keeps* punches and dies perfectly aligned—both vertically and radially. Its positive alignment assures trouble-free piercing of even the most complex shapes. Why not send today for the whole story? **Allied Products Corporation, Richard Brothers Div.**

CHECK THESE OTHER R-B FEATURES, TOO!

- ✓ Reduce press down-time for replacements
- ✓ Save design and assembly time
- ✓ Fast delivery on wide range of sizes and types
- ✓ Prompt service on "specials"

ALLIED PRODUCTS CORPORATION RICHARD BROTHERS DIVISION

DEPT. 57 • 12621 BURT ROAD • DETROIT 23, MICHIGAN

Please send me your 52-page free catalog.

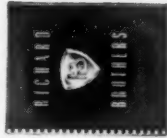
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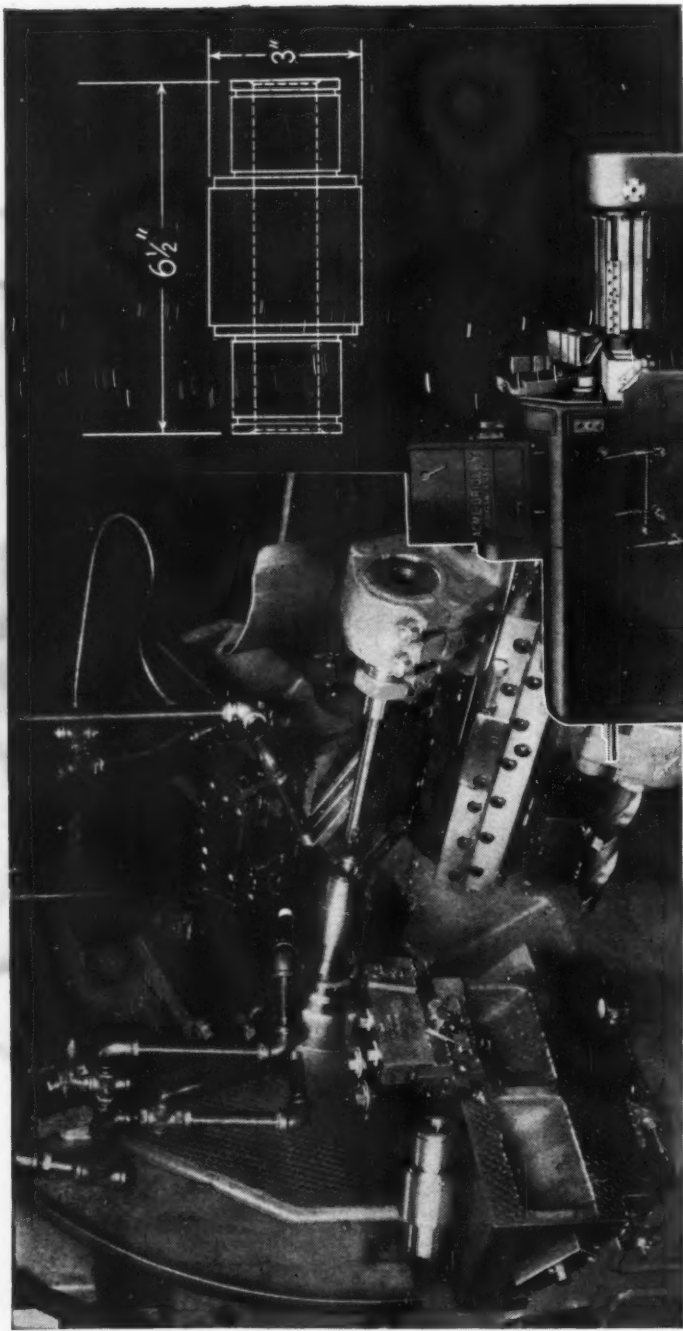
COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

Also Produced in
ALLIED'S FOUR PLANTS
HARDENED AND PRECISION
GROUND PARTS • STANDARD
CAP SCREWS • SPECIAL COLD
FORGED PARTS • SHEET METAL
DIES • ALLITE DIES CAST OF
ZINC ALLOY • JIGS • FIXTURES





The new 3 1/2" National Acme Model M Single Spindle Automatic is machining this steel shank, in 12 operations, in 5 minutes—twice as fast as the former method.

Steel Shanks Machined Twice as Fast

—AND TO .001 CONCENTRICITY

The new Acme-Gridley Model M Single Spindle Automatic has the strength to maintain close tolerances, such as the .002 total indicator reading for concentricity between the outside diameters and reamed hole of the steel shank illustrated. The rugged open frame provides plenty of room for chip clearance and for easy tool adjustment, too.

Frame strength adequate for high speed or carbide tools helps the Model M chalk up production records like this one. But that's only part of the Model M's time-saving story. Eight independently operated tool slides and three ranges of automatic spindle speeds permit the use of

speeds and feeds best suited to each cut. Several short end operations can be performed while heavy forming cuts are being made from the side slides.

For increased production, increased *profit*, get the new Model M—tops for ease of operation, speed, stamina and economy. It's built in three capacities from $3\frac{1}{2}$ " to $5\frac{1}{2}$ ". Ask for production estimates on your jobs.



- Complete information on the new Acme-Gridley Model M Single Spindle Automatic is contained in Bulletin M-50. Ask for your copy.

Machine obsolescence is the creeping paralysis that strangles profits.

The NATIONAL ACME CO.

170 EAST 131st STREET • CLEVELAND 8, OHIO

Acme-Gridley Bar and Chucking Automatics:
1-4-6 and 8 Spindle • Hydraulic Thread
Rolling Machines • Automatic Threading Dies
and Taps • The Chronolog-Limit, Motor Starter
and Control Station Switches • Solenoids
Centrifuges • Contract Manufacturing

NEW

MODELS—FEATURES

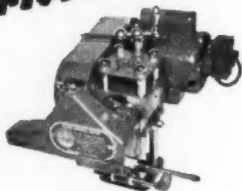
MASTER MILLING ATTACHMENTS

FOR PRODUCTION—TOOL ROOM—EXPERIMENTAL
AND MAINTENANCE SHOPS

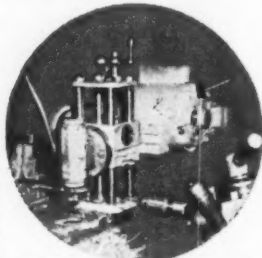


MILLING ON LATHE—Model "M" 1½ h. p. milling ½" keyway one foot per minute.

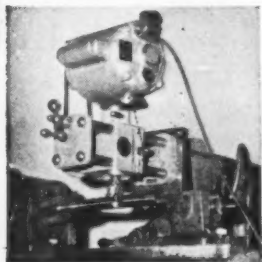
LATHES TURRETS AND MILLING ON MACHINES



*Master Universal
Slotting and Keyseating Head*



MILLING ON TURRET—Model "B" with 90° milling head mounted on rear cross-slide for keyways, slots, cross milling—completing part in turret.



ON MILL—One or two milling heads can be used on past assembly for single or multiple milling cuts. Mounts on overarm for vertical milling or cross-ways for opposed milling head.

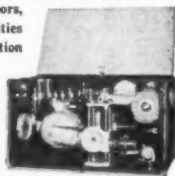
3 SIZES • CAPACITIES

Model "C"—½ h. p. motor—9" to 13" swing
lathes
Model "B"—½ or ¾ h. p. motor—14" to 18"
swing lathes
Model "M"—1 or 1½ h. p. motor—18" to 72"
swing lathes

The Master Lathe Converter is a precision multi-purpose machine tool attachment adaptable on most all basic shop machines. The basic unit does milling, drilling, boring, and has eight interchangeable heads for milling, drilling, grinding, slotting, keyseating, and indexing. Spindle speeds, 50 to 15,000 rpm. It provides complete machining facilities with minimum equipment investment, produces more operations per set-up thus increasing production of your present equipment, saves work transfer, assures accuracy, is simple and fast to set up. Prime and subcontractors are converting their present equipment for special applications and production with the multi-purpose Master Lathe Converter.

COMPLETE SHOP KIT—This group of equipment includes basic milling unit, external and internal grinding heads, 90° universal and hi-speed milling heads, slotting or internal keyseating head, 40 to 1 geared dividing head, seven arbors, in a heavy plywood shop cabinet. This kit provides facilities for most all machine shop operations on a lathe at a fraction of the investment required for individual machines, plus wide use on other basic shop machines. Ideal for maintenance and repair, tool room, experimental, mobile units, aboard ships, and production shops.

- ★ MILLING ★ DRILLING ★ BORING
- ★ THREAD MILLING ★ GRINDING
- ★ SLOTTING ★ INDEXING
- ★ INTERNAL KEYSEATING

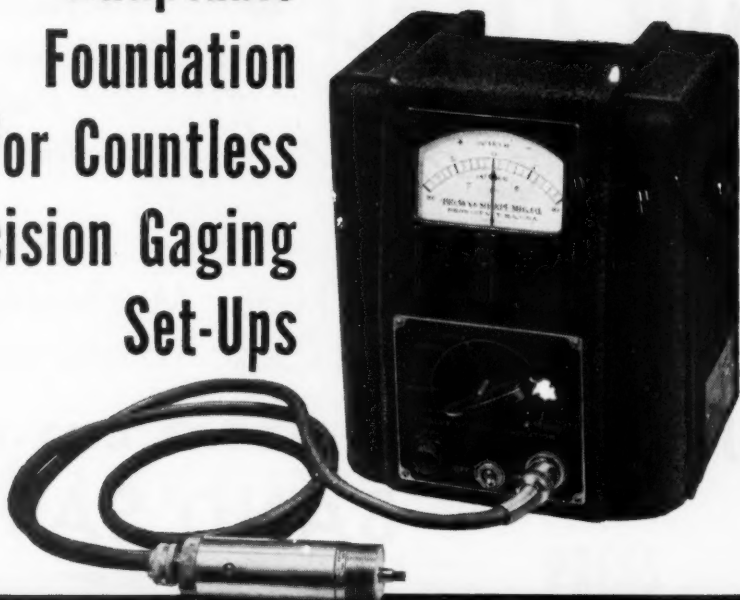


WRITE FOR FREE LITERATURE

MASTER MANUFACTURING CO.

1310 EAST AVENUE A
HUTCHINSON, KANSAS, U. S. A.

Adaptable Foundation for Countless Precision Gaging Set-Ups



Brown & Sharpe Gage Head Cartridge and Electronic Amplifier

Here's a really economical basis for versatile precision gaging equipment.

The Brown & Sharpe Gage Head Cartridge and Electronic Amplifier provide accurate gaging, with direct-reading indications, in units of .0001" to .00001". Simple jigs or fixtures to hold the cartridge often can be made in your own plant. By shifting the same cartridge among a number of fixtures, you can do precision gaging of practically any length, diameter, or other dimension. Write for complete details. Brown & Sharpe Mfg. Co., Providence 1, R.I., U.S.A.

WE URGE BUYING THROUGH THE DISTRIBUTOR



Brown & Sharpe

WE GO ALL OUT



*There is
a Johnson
Dealer
Near You*

to Maintain High Machining
Standards and Close Tolerances

JOHNSON METAL CUT-OFF BAND SAWS

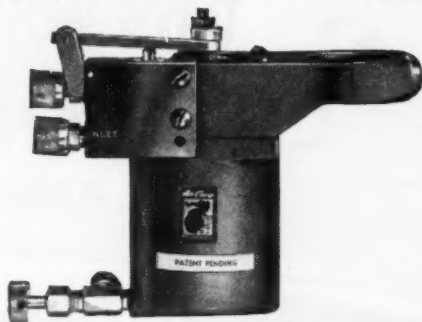
Accuracy in a saw depends entirely on the way it is built. . . . That's why we go the limit in maintaining high machining standards and close tolerances in the manufacture of Johnson Band Saws. **YOU CAN'T BUY A BETTER SAW THAN A JOHNSON.** For value, capacity, fast, continuous cutting action and economy, Johnson Saws lead the field. They will pay for themselves quickly and give dependable trouble-free service year after year.



Model J, pictured, 10"x18" Capacity, available as a wet or dry cutting machine. Also Junior Model B, (with or without casters) 5"x10" Capacity.

JOHNSON MANUFACTURING CORP.
ALBION, MICHIGAN

DOUBLE YOUR DRILL PRESS OUTPUT FOR \$33



USE A NEW MEAD PNEUMATIC DRILL

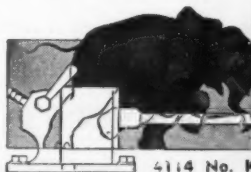
This simple, inexpensive device quickly converts standard drill presses into semi-automatic machines — increases production substantially on suitable jobs: double or more in some cases.

Clamps to spindle quill in a few seconds. Automatically closes air fixture on work. Adjustable feed control and break-through cushion. Quick return. Easy to synchronize with automatic cycle equipment.

Air-Power does it quicker, cleaner, better. Write today for latest complete catalog.

**PRESS
FEED**

**for
DRILLING
REAMING
TAPPING**

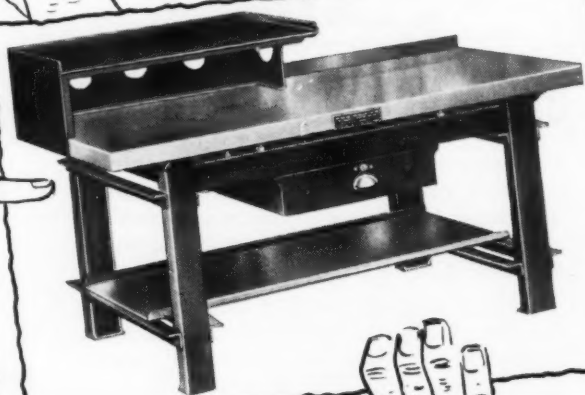


MEAD
SPECIALTIES COMPANY

4114 No. Knox Ave., Dept. YA-91, Chicago 41, Ill.



I CAN DO A BIGGER AND BETTER DAY'S WORK ON A **CHALLENGE** WORK BENCH



Four Sizes
28 inches wide x 4,
5, 6 or 7 ft. long.
Top 2" thick.

HERE'S WHY: Heavily ribbed, smoothly machined cast-iron top provides a "surface plate" . . . Table equipped with lock-leveling screws . . . Steel shelf in sturdy steel welded

base . . . Steel tool box shelf, guard rail, and drawer with lock . . . Vise and individual light can be easily attached . . . Bench is portable. Write for details.

666

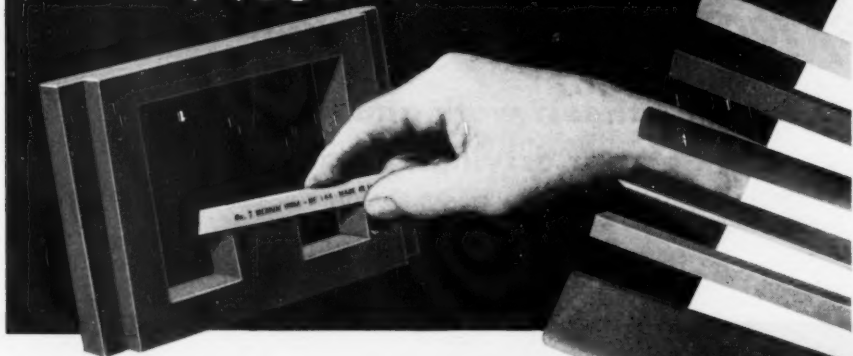
THE CHALLENGE MACHINERY CO.

*Office, Factories,
Show Room*



*Grand Haven,
Michigan*

PRECISION at the start MEANS PROFIT ALL THE WAY



INDIA® and HARD ARKANSAS

Oilstone Files of

NORTON® abrasives

THE FINAL STONING on a die may spell all the difference between a production job that's a headache — or a source of solid profit. In the trained hand of the diemaker, these NORTON Abrasive oilstone files are a true precision tool, fabricated to produce the initial accuracy that is reproduced in volume in the ultimate product. NORTON Abrasive electric-furnace INDIA and natural HARD ARKANSAS are available in a complete line of files, slips and bench stones.

IN PRODUCTION TOO . . .

These oilstone files are widely used for deburring, rounding edges, etc., on production work. They're also ideal for keen long-lasting edges on cutting tools.

Get your free copy of the Norton Abrasives "OILSTONE FILES" folder for handy reference. Request it today from Dept. BB-9.



BEHR-MANNING • TROY, N. Y.

COATED ABRASIVES • SHARPENING STONES • PRESSURE-SENSITIVE TAPES

EXPORT: BEHR-MANNING OVERSEAS INC., NEW ROCHELLE, N. Y., U.S. A. • CANADA: BEHR-MANNING CANADA (LTD.) BRANTFORD, ONT.

"SKIL Drivers *pay for themselves over and over again*

**with less work and time for
all our driving operations,"**

says MR. E. EPSTEIN, ALSCO MICHIGAN CORPORATION, Detroit, Michigan



SKIL Drivers turn the thousands of screws required for assembly and additional sturdiness in the aluminum storm windows and doors manufactured by the Alasco Michigan Corporation. That could be an expensive, difficult job... time-consuming and tedious... but with **SKIL** Drivers on the assembly line the screwdriving process is completed in a matter of seconds... with *1/10th the work!*



SKIL Drivers
on the assembly line
means a better
job in less time and
1/10th the work!

The Alasco Michigan Corporation uses **SKIL** Suspension Drivers, Model 316. They're compact, light weight, easy to handle. They've got plenty of power to drive the screws securely, accurately, neatly.

Model 316

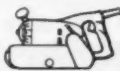
Used by the Alasco Michigan Corporation. Designed specifically for overhead suspension use. Recommended for efficient production line use for work of this kind, radios, toys, electrical appliances and other products of similar size. Adjustable clutch. Paddle switch. Capacity: $\frac{1}{4}$ " diameter machine screws, nuts; or No. 12 self-tapping screws. No-load speed: 750 r.p.m. standard. Overall length: $15\frac{1}{8}$ ". Weight: $4\frac{1}{2}$ pounds. Model 346 is identical, but with reversing switch.

SKIL Drivers—available in 20 heavy duty models

A complete line of electric screwdrivers and nut runners to meet practically all industrial requirements with peak efficiency. Wide range of capacities. Available in required speeds, with positive or adjustable clutch, with or without reversing switch. Call your **SKIL** Distributor for complete information, recommendations and an on-the-job demonstration.



SKIL Saw



SKIL Belt Sander



SKIL Disc Sander

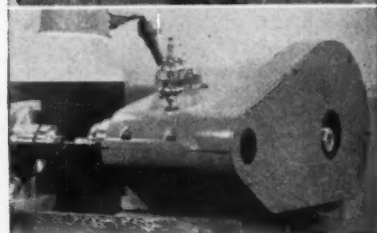
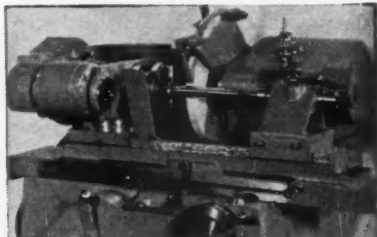
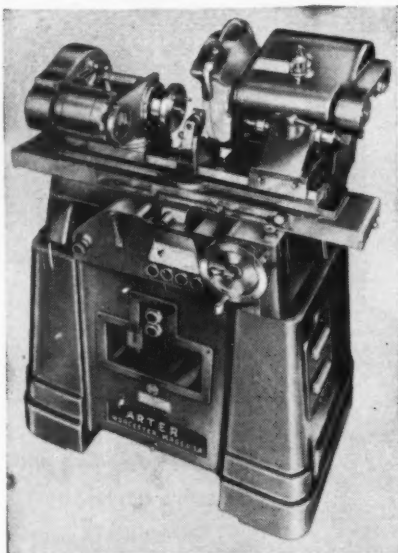


SKIL Drill

SKIL
PORTABLE TOOLS

SKIL Products are made only by SKILSAW, INC., 5033 Elston Avenue, Chicago 30, Ill.

Skilsaw Factory Branches in principal cities • In Canada: Skiltools, Ltd., 3601 Dundas Street West, Toronto 9, Ont.



ARTER

MODEL No. 103

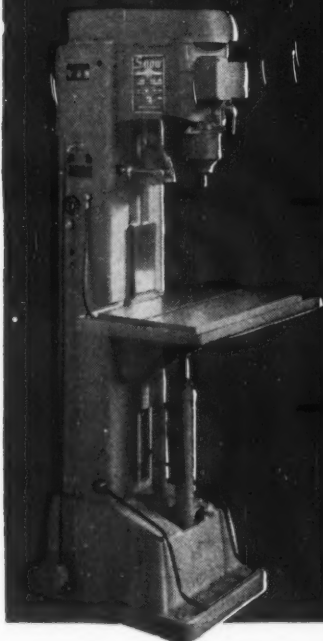
A relatively low-priced machine for cylindrical, internal, end or surface grinding.

The ARTER Model No. 103 grinder can be purchased as a combination machine for the classes of work illustrated, or it can be purchased just for cylindrical jobs, or for internal work. Many of these machines are being used for tool room work or as auxiliary equipment to take the overload of higher priced machines.

Capacities: With internal head — $\frac{1}{8}$ " to 3" dia. x 4" long. With external head — 3" dia. x 10" long. Swing over table 9".

ARTER
GRINDING MACHINE CO.
 WORCESTER, MASSACHUSETTS • U. S. A.

*For Top
Production*



Snow air operated—electrically controlled machines have built in full universal controls that allow selection of the type of spindle cycle desired. This feature also permits instant synchronization of the standard Snow Master Fixtures. All types of air operated automatic and semi-automatic jigs and fixtures are carried in stock. Standardization permits low cost tooling—and—high production.

Sensitivity of power application prevents tool breakage.

Simplicity of control means that set up and operation can be handled by a less experienced operator with minimum fatigue.

SNOW

FULL UNIVERSAL MACHINES

Air operated, electrically controlled Snow tools are establishing amazing production records daily on a wide variety of work. Just note these typical examples:

DRILLING

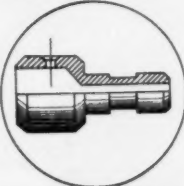
Crossdrill and C" T" Sink 1/16" Hole

Material—Brass

Production—4800 per hour

Fixture—#15 Vertical index

Equipment—#1-UD Drilling Machine



TAPPING

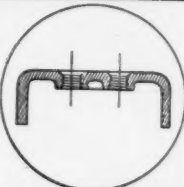
Tap Two #10-32 Holes

Material—Steel stamping

Production—3800 tapped holes per hour

Fixture—#14 horizontal index

Equipment—#1-UT tapping machine



THREADING

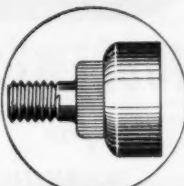
3/8"—24 Thread—1/2" Long

Material—Die Cast Aluminum

Production—2500 per hour

Fixture—#10 Drum dial

Equipment—#3-TR Threading machine



SNOW

MANUFACTURING COMPANY

435 Eastern Ave., Bellwood, Illinois
(Chicago Suburb)

Single Spindle Verticals • Two-Spindle Verticals • Two-Spindle Horizontals • Automatic Nut Tapping Machines • Drill Press Tap Heads • Automatic & Semi-Automatic Jigs & Fixtures

Submit Sample Parts for Production & Cost Estimate



NOBLEWEST PRECISION MARKING DIES

for
**MARKING
 GRADUATING
 NUMBERING
 KNURLING
 EMBOSsing
 DEBOSSING**

Noblewest makes dies for marking practically every type of surface, including round, flat, concave, convex and irregular contours. Noblewest dies are the finest that human skill and modern facilities can produce—*yet they are competitively priced.* Noblewest uses only specially selected steel, precision engraved to extremely close tolerances, and heat treated for extra long wear. Every Noblewest die is rigidly inspected and Rockwell tested for hardness. Large facilities permit prompt delivery. Send detailed specifications and we will gladly submit quotations. The Noble and Westbrook Mfg. Co., 9 Westbrook Street, East Hartford 8, Conn.



SPEEDS UP OPERATIONS IN TOOL ROOMS
... ON PRODUCTION LINES

DREMEL - *Electric* MOTO-TOOLS



DOES THESE
OPERATIONS
BETTER-
FASTER!

GRINDING

GRILLING

BURRING

POLISHING

DRESSING

SHARPENING

ENGRAVING

FINISHING

WRITE
FOR
INDUSTRIAL
CATALOG

APPROX.
27,000
R.P.M.

MOTO-TOOL KIT NO. 2 contains 23 accessories, including high-speed steel cutters and Model 2 Moto-Tool in natural finish hardwood case\$23.50

MOTO-TOOL No. 2, with one emery wheel point\$16.50

Dremel HIGH-SPEED STEEL CUTTERS and balanced wheel points are available for all makes of hand grinding tools. Write for literature.

"THE POCKET-SIZE MACHINE SHOP"

Dremel Moto-Tools are time tested—have been widely used in industry for over fifteen years. A veteran of World War II, Moto-Tool served in war plants and at military maintenance bases throughout the world. Thousands of these mighty midgets helped to make the atomic bomb—were used to establish production records in defense industries during the last war. Hundreds of toolroom and production line operations, such as polishing and grinding dies, burring parts, marking tools, sharpening cutters, touch up jobs, etc. are accomplished in seconds, without tearing down "set-ups." Moto-Tool is sturdily constructed for long lasting industrial service. Weighs only 13 oz.—dynamically balanced for vibration-less operation.



DREMEL MFG. CO. Dept. 211-J **RACINE, WIS. U.S.A.**

DO YOU MANUFACTURE PUZZLES?

How many man hours are lost every day in your plant because metal components are not properly marked?

How much time do your customers spend trying to identify parts for re-ordering or replacement?

Are you losing good business because your components are not permanently and legibly marked for instant identification??

Would the use of modern marking equipment save you money?

Simply send prints or samples of parts to be marked, together with exact lettering and its location, for free recommendations.

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MARKING MACHINES — ENGRAVED
STAMPING AND EMBOSSING DIES —
SPECIAL MARKING TOOLS — NUMBER-
ING HEADS — HAND STAMPS.



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PRIME EXPEDITER



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COMPARE FOR FEATURES COMPARE FOR PRICE ... you'll choose the **LUCIFER Furnace!**

Pore over specifications and manufacturer's data sheets and you'll end up buying the LUCIFER Furnace every time!

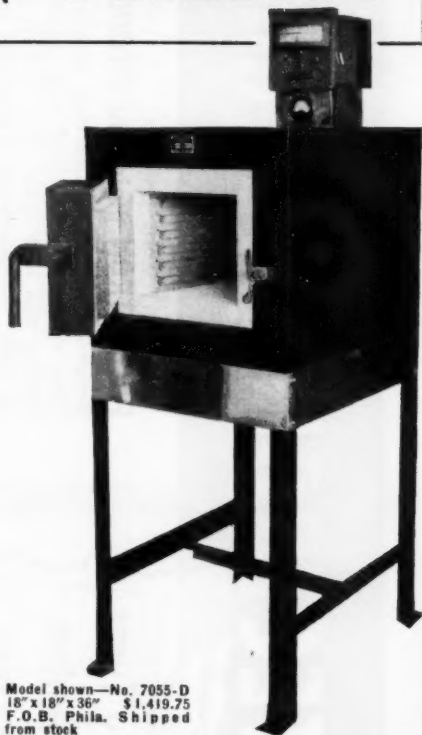
Whether its the Lucifer 6"x6"x12" furnace at \$467.00 or the model shown at \$1,419.75 for 2000' and \$1,629.50 for 2300', LUCIFER represents the ultimate in value.

There's a minimum of 5" of refractory insulation in every model. This is composed for four different types of refractory for greatest protection. Double sealing doors. And the LUCIFER controls are the greatest in the field! Our automatic electronic controls are the simplest, most reliable type. Just dial the desired temperature, throw the switch and your LUCIFER quickly climbs to the desired temperature. Then it stays at that temperature—it can't overheat.

The LUCIFER Electric Furnace is complete—nothing else to buy. Can be in operation within one hour after uncrating!

Write for FREE descriptive literature giving sizes, temperature ranges, K.W. Rating and list of "Blue Chip" users. Prompt attention given all requests for engineering assistance.

2 to 3 weeks delivery!



Model shown—No. 7055-D
18" x 18" x 36" \$1,419.75
F.O.B. Phila. Shipped
from stock

GILBERT S. SIMONSKI CO.
Precision Machine and Tool Work
401 N. Broad St., Phila., 8, Pa.
Sole Manufacturers
LUCIFER
Electric Furnaces

PROTECTRON gives industry

The Journal of Commerce

Industry Turns To Preventive Maintenance

Emphasis Now Being
Shifted from Repair
As Shortages Grow

PROTECTRON maintains *PRODUCTION CONTINUITY*

Break-downs in production machinery cost industry millions of dollars in repair and thousands of man hours lost during the last war. Now, when production continuity is so vital, management is alarmed over the irregular quality of materials and the growing shortages of manpower and parts. But PROTECTRON can solve their problems, by providing the only sure guarantee of effective preventive maintenance.

the only FULLY AUTOMATIC

PROTECTRON trouble shoots *BEFORE* trouble begins

No single device saves so much, so quickly and at so little cost. PROTECTRON senses minute increases in mechanical load and automatically "trips" machines before damage



It can't happen with PROTECTOR

senses oversized or overnara stock, pine-ups, mistreads, faulty lubrication. It is adaptable to almost every automatic operation where damage to tools, dies, and equipment would mean expensive replacement and loss of valuable production time.

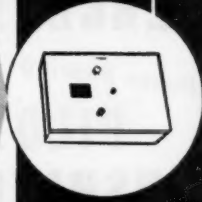
DAMAGE CONTROL SYSTEM



Get TOP PRODUCTION with *LESS MANPOWER*

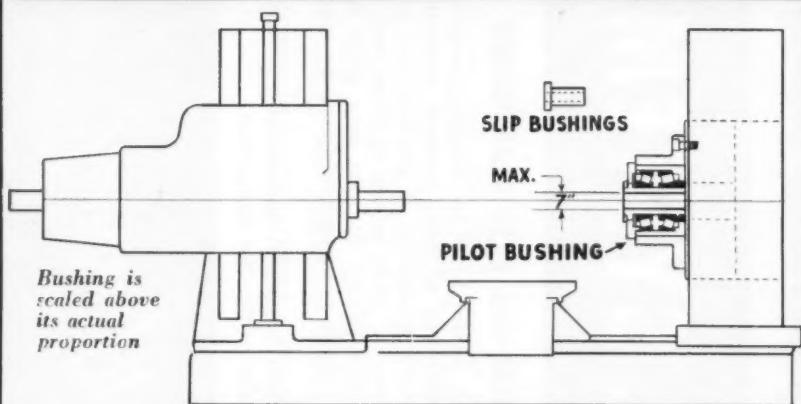
PROTECTOR can be a potent force in reducing overhead and increasing the efficiency of your present personnel. By its vigilant, automatic protection it enables one man to operate four machines . . . thus releasing three men for other work. Consider this saving in your own plant and you'll see why PROTECTOR is being acclaimed by manufacturers everywhere.

Let our field engineer determine
your requirements. No obligation.



The Brinnell Company

GRANBY, CONN.



Boring Bar Chatter?

... We have the answer



JERGENS

Roller Bearing

**PILOT
BUSHING**

Replace your worn bronze backrest bushing with a Jergens Roller Bearing Pilot Bushing and eliminate the chatter due to backrest bushing wear . . . Merely requires bolting adapter plate to back rest in order to carry Jergens Bushing, equipped with Timken Precision Tapered Roller Bearing . . . Increases precision, insures years of silent, smooth, speedy backrest performance, by eliminating bar wear. . . . Readily changeable for bar sizes by means of slip removeable bushings. Unit sealed against dust and grit but provides take-up for any ultimate slight wear. . . . This is only one of many Jergens Pilot Bushing applications that minimize down time and keep machines working and earning. Write for full information.

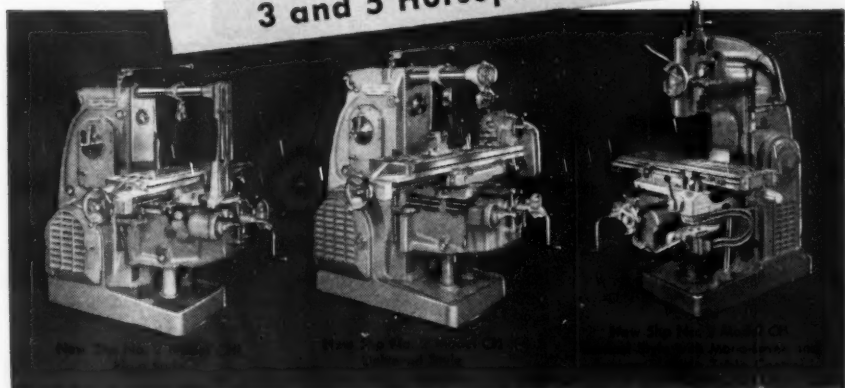
J. G. JERGENS CO.

11106 AVON AVE., CLEVELAND 5, OHIO

KEARNEY & TRECKER ANNOUNCES . . .

Three new Knee-type Machines

3 and 5 Horsepower



New Kearney & Trecker No. 1 CH, No. 2 CHL and No. 2 CH Milling Machines have every performance-proven operating and construction feature needed for modern short-run or production milling requirements.

Machine	Working Surface	TABLE				SPINDLE	
		Power Feed Travel		Feeds Number & Range	Power Rapid Traverse — " Per Min.	Nat'l Std. Taper	Speeds — Number and Range
		Plain & Universal	Vertical				
No. 1 Model CH Plain, Universal and (swivel head) Vertical	40" x 10½"	Long. 22"	22"	16—½" to 32"	150"	40	16 — 25 to 1500 RPM
		Cross 9"	10"		75"		
		Vert. 17"	16"	16—¼" to 16"			
No. 2 Model CHL Plain, Universal and (swivel head) Vertical	46" x 10½"	Long. 28"	28"	16—½" to 32"	150"	40	16 — 25 to 1500 RPM
		Cross 10"	10"		75"		
		Vert. 17"	16"	16—¼" to 16"			
No. 2 Model CH Plain, Universal and (sliding head) Vertical	50" x 12"	Long. 28"	28"	16—¼" to 32"	150"—plain & vert. 100"—universal	50	16 — 25 to 1500 RPM
		Cross 10"	12"		75"—plain & vert. 50"—universal		
		Vert. 18"	15"*	16—½" to 16"			

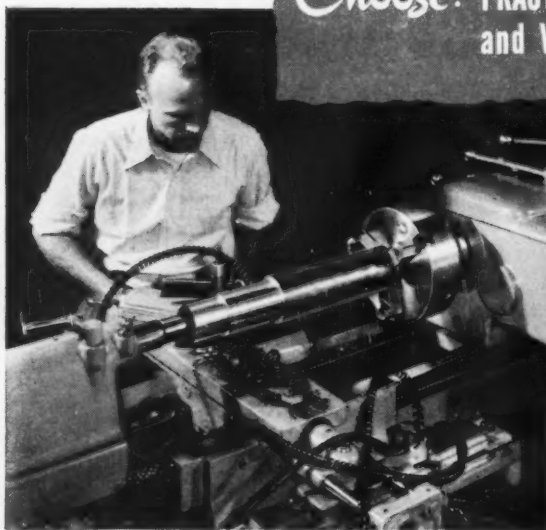
*Add 4" vertical travel for sliding head

These specifications point up the new larger working ranges of these new machines. You'll find they provide you with new major cost-cutting possibilities for toolroom and production work. Feeds and speeds listed are standard ranges. Optional ranges available.

If you're looking forward to modernizing your tool-room or milling machine line — you can't afford to overlook these new 3 and 5hp knee types. They offer you more practical operating features and heavier construction than any comparable equipment. They're designed to answer today's milling needs — and tomorrow's as well. For complete data on these machines, contact your nearest Kearney & Trecker representative or write direct. Kearney & Trecker Corp., 6784 West National Avenue, Milwaukee 14, Wisconsin.



Choose: PRACTICAL PRODUCTION SIZE and WIDE JOB FLEXIBILITY



The Rockford Economy Lathe is of sufficiently heavy construction to stand up under general production and maintenance use, while providing the accuracy needed for the tool room. Its dimensions are ample. High quality materials are used liberally and judiciously.

- When you check the Rockford Economy Lathe, you'll see how highly qualified Rockford engineers have combined quality materials, modern machine tool design, and precision workmanship to provide a better Lathe in the medium price range for general production, maintenance and tool room work.

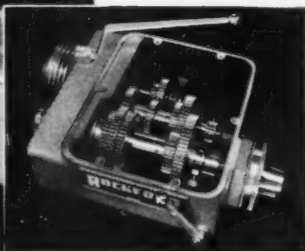
A Rockford representative will give you full details, or send for Bulletin No. 900D.

Buy THE MOST LATHE
FOR MORE WORK

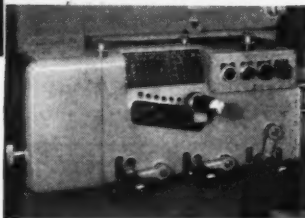
MEDIUM-SIZED
ECONOMY-PRICED

ROCKFORD ECONOMY LATHES - 16" and 18"

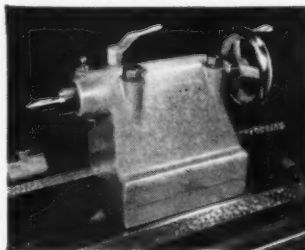
ROCKFORD MACHINE TOOL CO. • ROCKFORD, ILLINOIS



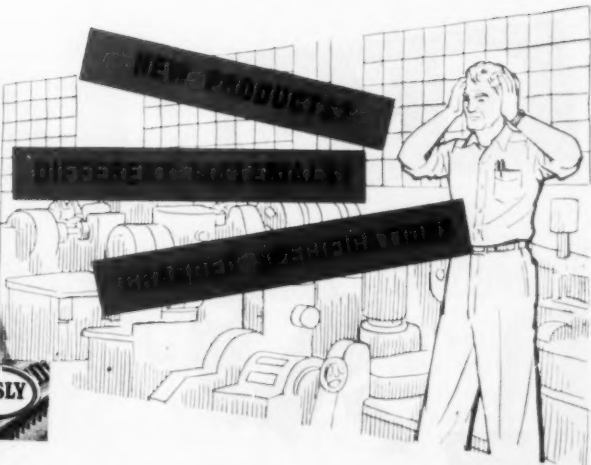
All headstock gears are cut from individual pre-heat treated steel forgings, annealed to the hardest machineable state and hubbed and shaved to provide smooth, quiet operation.



The quick change gear is designed to provide a full range of commonly used threads from 4 to 56 per inch and carriage feeds from .004" to .060" per revolution of spindle.



The heavily constructed tailstock is equipped with anti-friction, thrust bearings for ease of operation.



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 Help You **Solve Today's Problems Today!**

**UNSURPASSED
 ACCURACY at
 all vital points**



**Microcentric
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**Solid Ground
 THREAD FORM**



**"Right"
 ROCKWELL**



**Mirror Finish
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**Tru-Square
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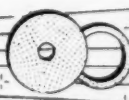
Today's conditions demand many a re-check of tap and drill specifications—because most shops are coming up against new materials . . . using substitute materials . . . or tooling up for unfamiliar work. Besly servicemen, today, are using their wide knowledge of drilling and tapping to extend tool life and help you overcome new and difficult job conditions. Their knowledge begins with tool design and carries through to on-the-job application of the *best* tap and drill for your work . . . whether standard or special. Ask your Besly Distributor to call in the Besly Serviceman to work with you on your "problem" jobs.



TAPS — the
 world's most
 accurate tap.



**TWIST DRILLS
 AND REAMERS**
 —Complete line
 for every need.



**TITAN ABRASIVE
 WHEELS AND
 DISCS**—Individually formulated
 for your job.



GRINDERS that
 reduce costs on
 every type of
 surface grinding.

CHARLES H. BESLY & COMPANY

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 Factory: Beloit, Wisconsin



high boring costs make you blue?

LET THE MAN WITH HOLES IN HIS HEAD LOWER THEM FOR YOU

Every Madison cutter, and bar, no matter what its size, is designed to do your boring operations faster at lower cost. With Madison cutters and bars you never get those high-boring-cost-blues.

Madison cutters range in diameter from $\frac{1}{8}$ " to any desired size. Madison bars range from $2\frac{1}{2}$ " to fourteen feet in length . . . or longer. The secret of Madison's ability to cut costs is Madison's exclusive cutter and bar design. First, there is Madison's two bladed cutter. It provides generous chip clearance . . . permits faster cutting without overheating. Second, is Madison's exclusive float design. Cutters float in Madison bars, special floating tool holders are never needed . . . both edges of the cutter take an equal bite. That means more holes per cutter, longer cutter life with fewer regrinds. You get these features, plus many other Madison advantages, when you ask the "Men With Holes in Their Heads" to cut your boring costs. Write today. A brief letter will do.

Write for the information filled Madison Catalog: It is yours for the asking.



MADISON

MANUFACTURING COMPANY

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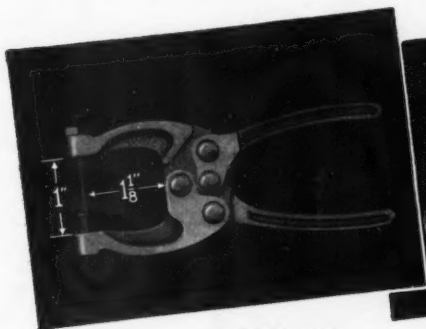
MUSKEGON, MICHIGAN

If you have to

HOLD

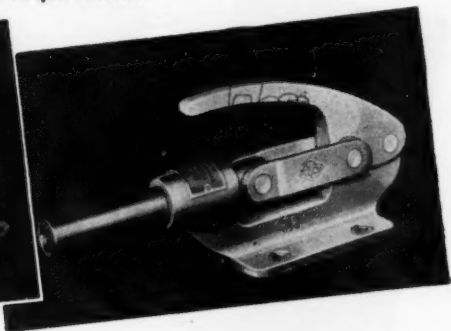
ANYTHING in your production operations

Hold EVERYTHING with "DE-STA-CO" Toggle Clamps in welding, riveting, bonding, machining and assembly. • Fast clamping, positive holding pressures, instantaneous release—Toggle Clamps speed up your operations and cut your costs. • There are more than 40 different Toggle Clamps manufactured by Detroit Stamping Company in various types and sizes to meet industry's requirements.



**MODEL 424
PORTABLE PLIER CLAMP**

For one-hand use in cramped work areas and small space. Deep jaw capacity but only 4½" in length.



**MODEL 650
HEAVY DUTY PLUNGER CLAMP**

For "push-pull" work-holding jobs where considerable pressure is needed. Compact; up to 4000 lbs. capacity.

MODEL 235-U RETRACTABLE CLAMP (Not illustrated)

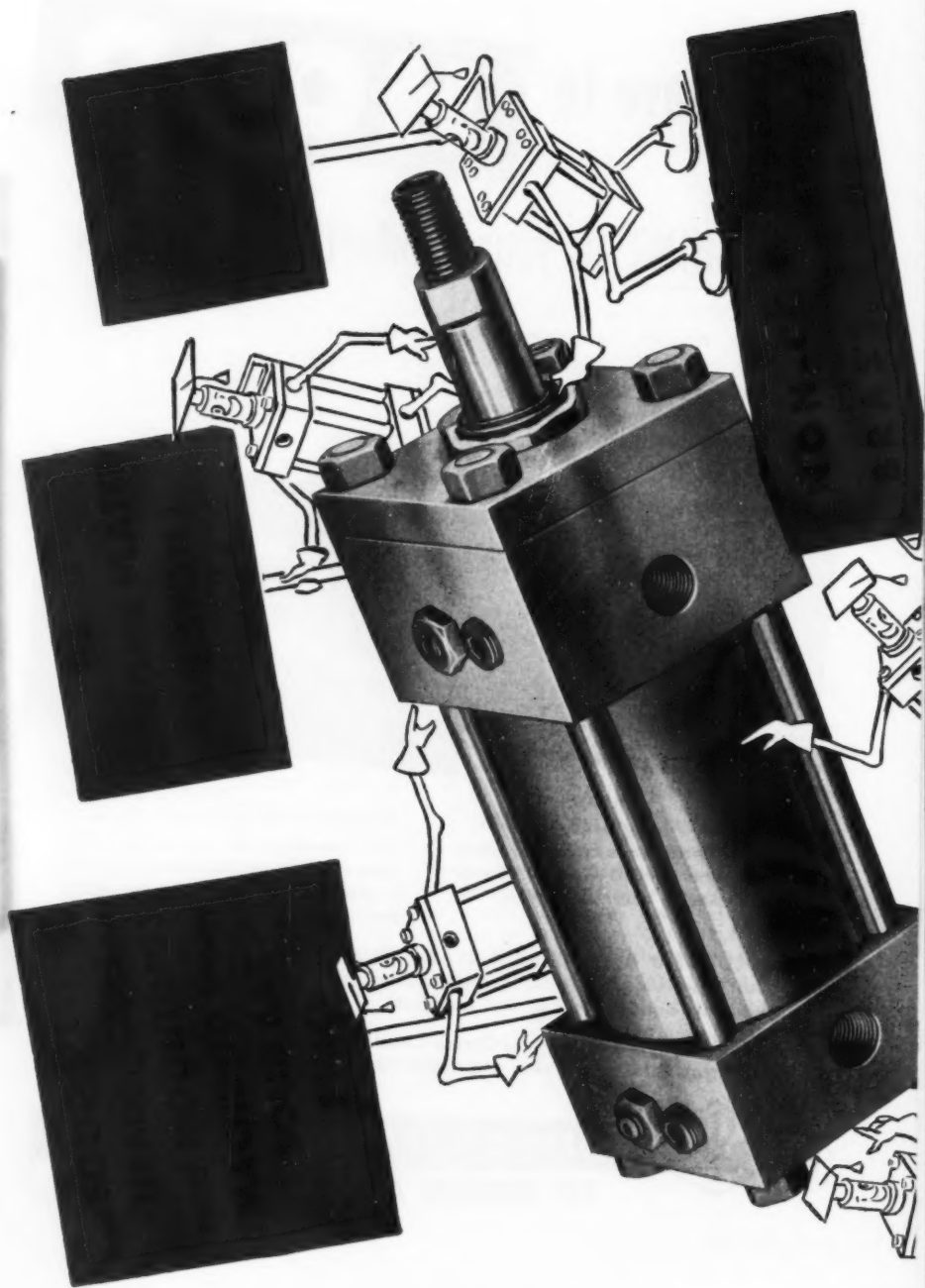
Quick, unimpeded loading and unloading of fixtures easily possible with this one. Up to 750 lbs. pressure.

Ask for "DE-STA-CO" Toggle Clamp Catalog and name of representative nearest you who is stocking our entire line of Toggle Clamps.



DETROIT STAMPING COMPANY

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Meet J. I. C. PNEUMATIC STANDARDS

(Write for FREE copy of these "Standards")

The four features illustrated above serve to show how Miller Air Cylinders *for years* have been meeting—even exceeding—the high quality set by the recently adopted J. I. C. Pneumatic Standards for Industrial Equipment. See for yourself! . . . write for our free bulletin A-105 and receive also your own *free* personal unabridged copy of these "Standards" with standard symbols, sample circuit, interesting point-by-point comparison—all neatly compiled into a handy booklet that fits your reference file and folds to fit your pocket.

COMPLETE MILLER CYLINDER LINE INCLUDES: AIR CYLINDERS, 1½" to 20" BORES, 200 PSI OPERATION, LOW PRESSURE HYDRAULIC CYLINDERS, 1¼" TO 6" BORES FOR 500 PSI OPERATION, 8" TO 14" BORES FOR 250 PSI, HIGH PRESSURE HYDRAULIC CYLINDERS, 1½" TO 12" BORES, 2000-3000 PSI OPERATION. ALL MOUNTING STYLES AVAILABLE.



MILLER MOTOR COMPANY

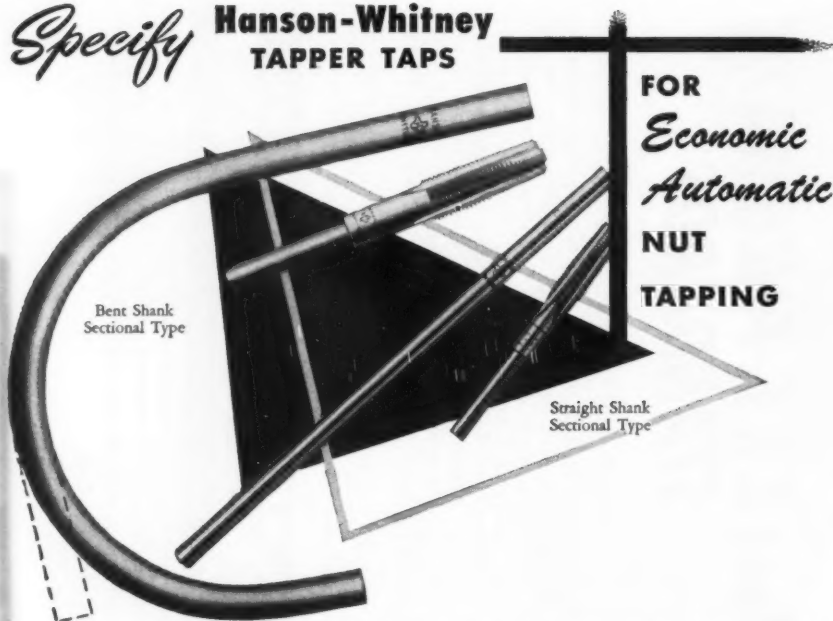
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ST. LOUIS AND OTHER AREAS.

Sales and Service from coast to coast

Specify **Hanson-Whitney TAPPER TAPS**



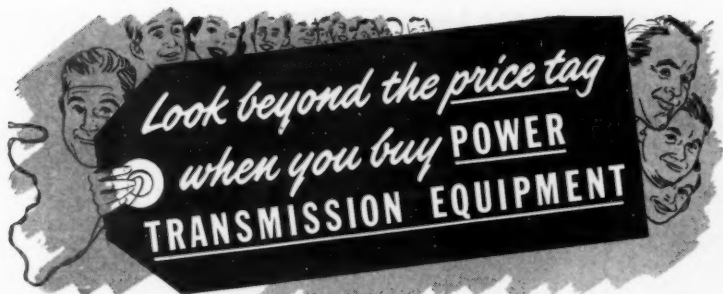
While one piece Tapper Taps . . . both straight and bent shanks . . . are available in standard and special sizes, we recommend the sectional type shown. Used with automatic tapping machines, they are most economical, as the nibs, soldered into shank, can be readily replaced when worn beyond further use. Shanks seldom require replacement.

Sectional type tapper taps are furnished in standard NC and NF series from $\frac{1}{4}$ " to $\frac{3}{4}$ " diameter. Intermediate sizes and other thread forms are special. As there are several types of automatic tappers, the name and size of your machine must be given. Shank designs furnished as follows: BENT SHANK — hook or right angle design as illustrated. STRAIGHT SHANK — round, square, Acme Improved Type "C," or National Interchangeable Ring Lock.

Hanson-Whitney taps are finished after hardening on machines of our own design for Quality Control. For more tapped holes per grind and lower cost per piece, specify the H-W line.

HANSON-WHITNEY COMPANY • HARTFORD 2, CONN. • DIVISION OF THE WHITNEY CHAIN COMPANY





"SAVED": \$7.82 by buying a cheaply made speed reducer
LOST: \$164.18, including a whole tankful of valuable chemicals



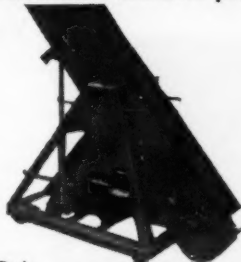
BOSTON REDUCTOR

Cost	\$206.60
Cost of inferior speed reducer ..	\$198.78
Difference in cost	\$ 7.82
Value of spoiled chemicals ...	\$100.00
Cost of disassembly and replacement (2 men, 3 hrs., @ \$2.00 per hr.)	\$ 12.00
Loss of profit and overhead on 3 hours production	\$ 60.00
NET LOSS	\$164.18

"SAVED": \$5.70 by buying a cut price motorized speed reducer
LOST: \$155.90 worth of time, labor and defense production

BOSTON RATIO MOTOR

Cost	\$140.50
Cost of "bargain counter" motorized speed reducer	\$134.80
Difference in cost	\$ 5.70
Cost of pulling down conveyor and replacing defective speed reducer (2 men, 4 hrs., @ \$2.25 per hr.)	\$ 18.00
Cost of taking parts while conveyor was idle (6 men, 6 hrs., @ \$1.35 per hr.) ..	\$ 48.60
Loss of profit and overhead	\$ 95.00
NET LOSS	\$155.90



The hidden quality in BOSTON Reductors and Ratio-motors stems from BOSTON Gear's strict materials control, master craftsmanship and rigid inspection system, backed by 71 years of experience in the manufacture of standardized, interchangeable, stock power transmission equipment and parts.

Specify Standardized BOSTON Gear Products — Design them into your equipment — Get them from nearby stock.

Write for Catalog 55. It contains a wealth of useful data and selection charts.

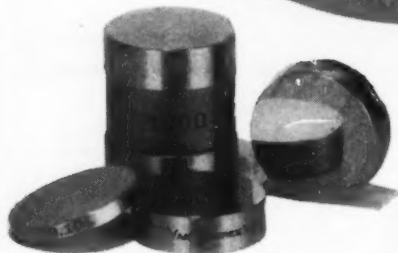
BOSTON GEAR WORKS

77 HAYWARD ST., QUINCY 71, MASS.



Van Keuren

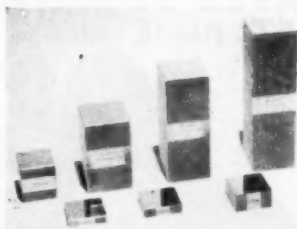
GAGE BLOCKS for every REQUIREMENT



VK MICROGAGES

PUT ACCURACY AT THE MACHINE
.000010" ACCURACY

SETS FROM \$15.00 - \$125.00



VK SOLID SQUARE MASTERS

The 30 year blocks • 5 year guarantee
LABORATORY USE OR TO
STANDARDIZE ALL PLANT DIMENSIONS
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VK RECTANGULAR BLOCKS

For Inspection Department
or precision set-up
.000008" ACCURACY

SETS FROM \$140.00-\$325.00

SETS FROM
\$375.00-\$750.00



Catalog and Handbook No. 34.

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THE *Van Keuren*
CO.,

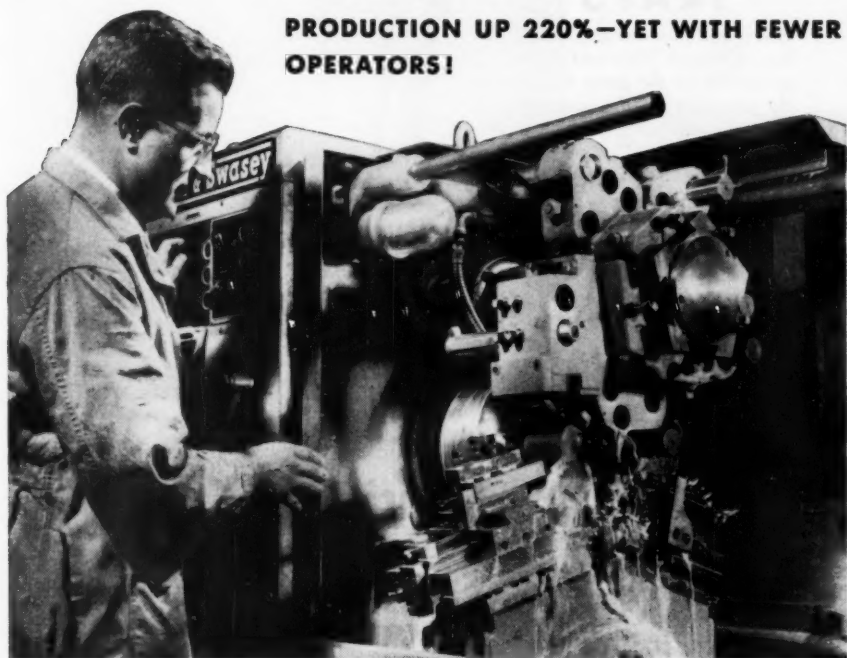
32nd YEAR

177 WALTHAM STREET, WATERTOWN, MASS.

Light Wave Equipment • Light Wave Micrometers • Gage Blocks •
Taper Insert Plug Gages • Wire Type Plug Gages • Measuring Wires •
Thread Measuring Wires • Gear Measuring System • Shop Gages •
Carbide Plug Gages • Carbide Measuring Wires

An especially important story today....

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Warner & Swasey 1-AC Automatic Chucking Machine used at THE COOPER ALLOY FOUNDRY CO., Stainless Engineering & Machine Works Division, Hillside, N. J.

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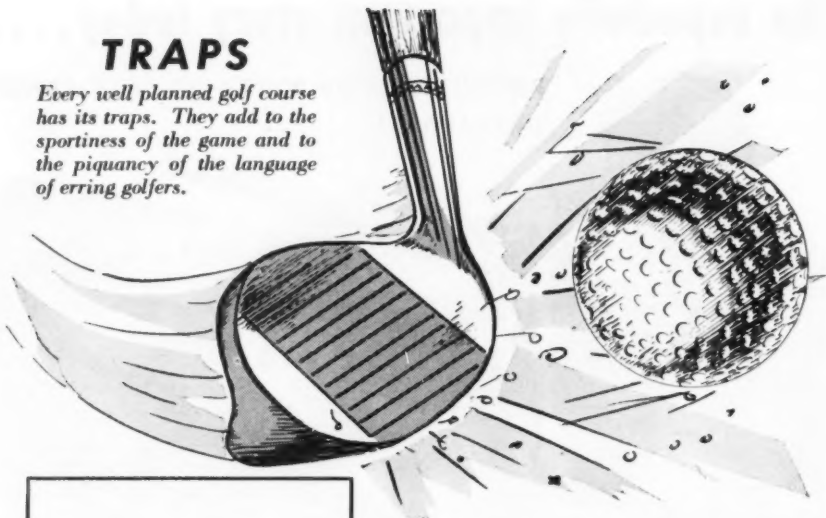
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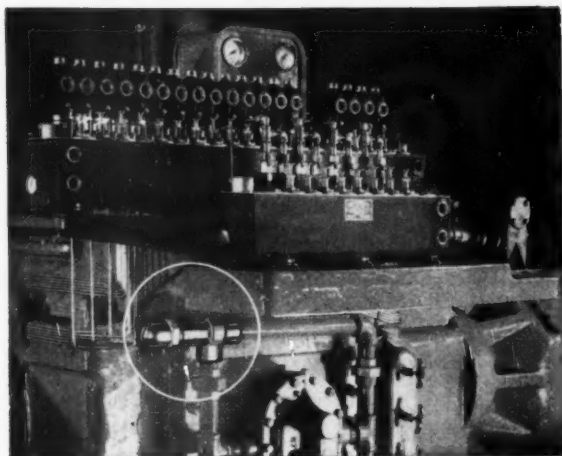
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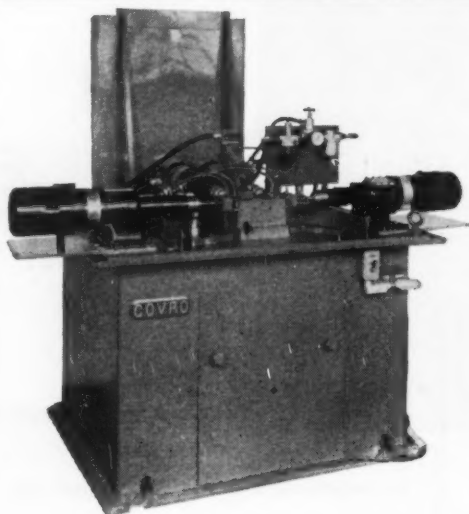
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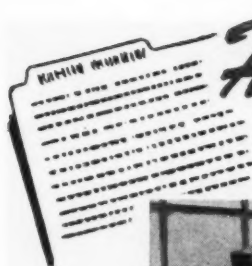
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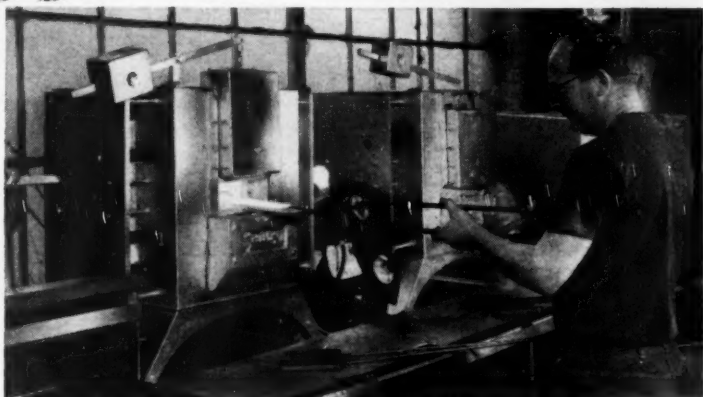


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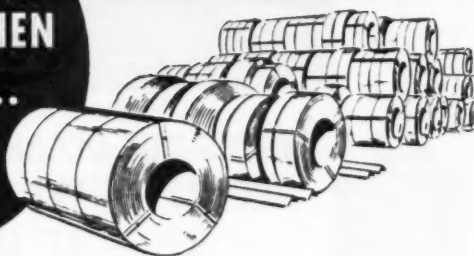
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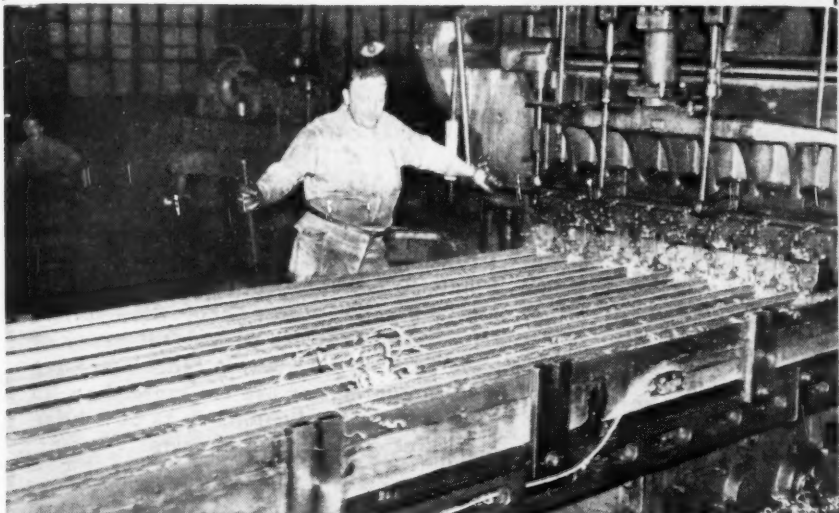
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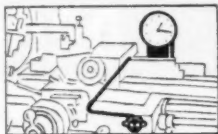


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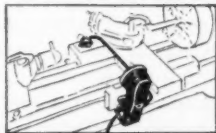


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Rear view showing how easily the Distometer can be installed on machines.



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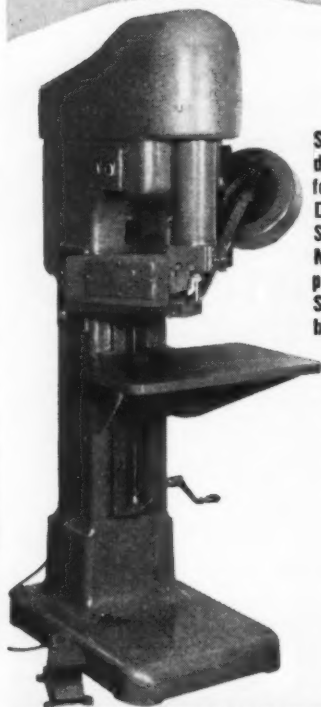
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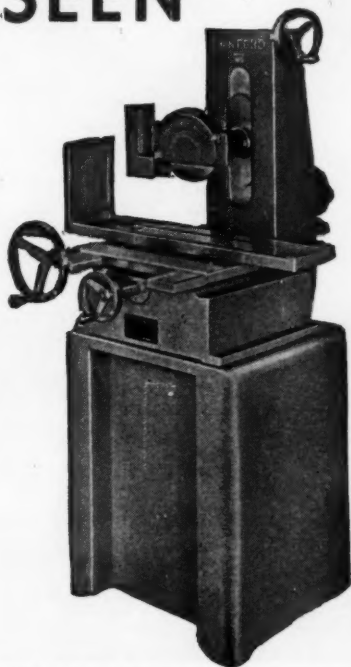
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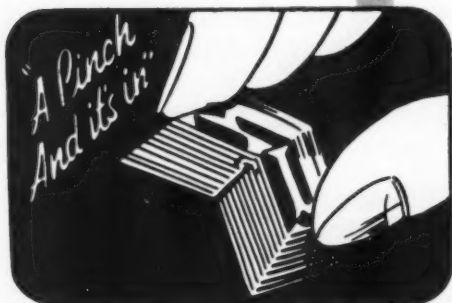
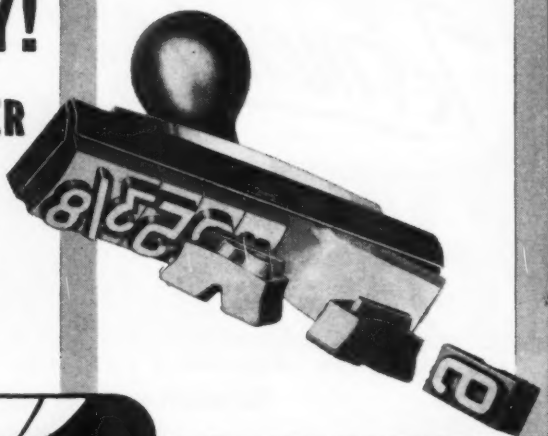
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Washington news letter, by Arnold Kruckman, Washington correspondent. Page 81

How's business? Page87

Interesting set-ups and machining operations in Southern Pacific RR shops, by Gerald Eldridge Stedman. Some of the repair and maintenance operations in the El Paso shops of the Southern Pacific RR are extremely interesting. Mr. Stedman, Blue Book's field editor has written an interesting article describing some of these operations. Page 93

Using a movie camera in setting and selling production standards, by Harold R. Nissley. With the emphasis on close control of cost and of production it is important to have most efficient methods for setting production standards. How the movie camera is used in this work is described by the author. For those wishing to use this method a section of his article is devoted to a description of the tools required. Page106

Production shots at Axelson Manufacturing Co., Los Angeles, by Fred M. Burt. This west coast machine tool builder uses some ingenious tooling devices and production methods. A description of some of the operations performed in this modern shop are described by the author. Page 137

Understand basic metal cutting process if you want to evaluate cutting fluids, by M. Eugene Merchant. Heat being the most dangerous enemy of cutting operations it

is important to know what causes heat and how it can be eliminated. Cutting fluids reduce heat in varying degrees; therefore, to select the proper cutting fluid for an operation it is advisable to know as much about basic metal cutting process as possible. Page145

Special report on lathes, part 3. This is a continuation of the lathe reports which began with the July, 1951 issue. It is the 15th special report on machine tools published by the Machine and Tool Blue Book since May, 1950. Reprints of some of the reports are still available. Included in this month's report:

Understand basic metal cutting process if you want to evaluate cutting fluids. Page145

Description of late model lathes. Page160

Specifications of American-built machines. Page176

Professor Reichardt's quizzes. Page 124-148

Shop hints. Page195

Modern tools in action. Page201

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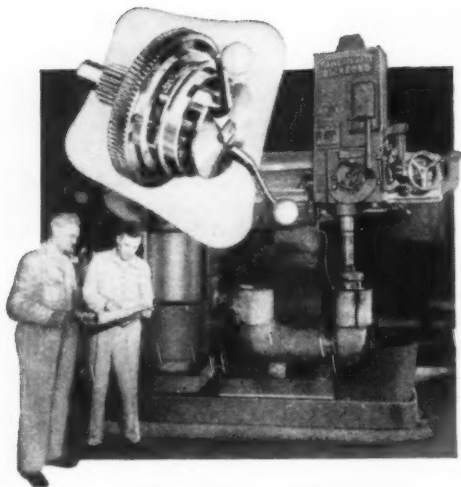
New books. Page234

What's new in metalworking? Page237

Mechanics through the ages. Page306

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At the Wheland Company, Chattanooga, Tennessee, this 6' arm 19" diameter column SUPER SERVICE Radial is boring 11-1/8" diameter holes out to a finished size of 11-3/4" diameter in cast steel pump parts, holding an accuracy of plus or minus .001"

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Heavy work is being performed with absolute safety on Cincinnati Bickford SUPER SERVICE drilling machines, with extreme ease of operation. Unlike any other, the SUPER SERVICE clutch is a sturdy positive tooth type. It has a large diameter hardened steel ring, with saw tooth serrations on the inner circumference, into which two opposed serrated hardened steel segments are snapped instantly by touching either one of the twin quick return levers. This requires only finger tip effort.

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THE CINCINNATI BICKFORD TOOL CO. Cincinnati 9, Ohio U.S.A.



SEPTEMBER, 1951

AS THE EDITOR SEES IT •

AS THE EDITOR

MTBB

SEES I

Hi, yah, bottleneck!

On several occasions in the past I have predicted that ere many more moons would pass the machine tool industry would be labeled the bottleneck of the defense program, and many a grubby Washington finger would point at us in scorn. This prediction has been shared by many leaders of the machine tool industry. Well, the moons have passed, and how do you like being a bottleneck?

By receiving word from some important manufacturers that they cannot produce war material unless they have tools, and by training their intellectual capacities to the breaking point the Jungle Jims of Washington have put two and two together. They have come to the conclusion that classifying a machine tool in the same category as a pencil sharpener hasn't worked. There seems to exist some slight difference between the two items; trivial, to be sure, but a difference nonetheless.

Now there are great rattlings in Washington. Something must be done. Let's give the machine tool industry the needle. The obstacles to greater productivity, imposed by Washington, are slowly and laboriously being wheeled away. And surprisingly enough, there's nothing wrong with the

industry that a little intelligent thought couldn't have cured long ago.


You simply cannot put a guy in a burlap bag, give him a smart slap on the rump and tell him to run like blazes.

There are competent men in Washington who have a grasp of industry's needs, and who can look farther than a sense of their own importance. But they are in the minority and so overwhelmed by the mediocrity around them that they simply cannot get their feet apart to do a job. To those men our hats are off; we need so many more of them in Washington, so many more.

With the removal of production obstacles, by listening a little closer to the machine tool advisory committee in Washington and by getting rid of the evil thought that every businessman is a crook, official Washington will witness the machine tool industry producing the tools that are so urgently needed. Even though official awareness of the importance of the machine tool industry is a little tardy, and much time has been squandered, the machine tool industry is a hardy animal, it can still get the tools out.

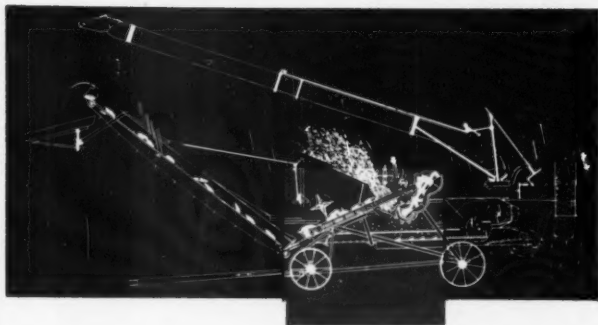
But ya gotta' let it out'a the burlap bag!

how rolls of iron



A Prominent Corn Husker Builder in Milwaukee chose this LeBlond 20" Rapid Production Lathe to turn these tough cast iron rolls. Depth of cut, 5/16" (intermittent); feed, .050 ipr; surface speed, 90 fpm; tool, 30° negative-rake carbide; tool life, 200 pieces.

help put meat on your table



At the heart of machines that husk corn and shred the stalks into fodder are iron rolls like these! They help the farmer convert his crop to feed for livestock—the steers and hogs that become tender steaks and juicy hams for your table.

A prominent Milwaukee builder of husker-shredder machines for more than sixty years, needed a production lathe to turn these rolls... a lathe rugged enough to take the beating of a $5/16$ " intermittent cut at .050" feed and 90 surface feet per minute, and to withstand the forces of a 30° negative-rake carbide tool, cutting iron hardened by casting around a steel shaft!

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A LeBlond 20" Rapid Production gives you high production turning of a variety of work within the range you choose. It offers two speed ranges, 45 to 300 rpm or 67 to 450 rpm, and 18 feeds from .005" to .150".

Not a converted engine lathe, it has no quick-change box or leadscrew, expensive features unnecessary for production work.

Whether you're turning rugged rolls or precision shafts, there's a LeBlond Lathe to turn them faster, better. Your LeBlond Distributor will tell you about the 20" Rapid Production and other late models. Call him or write—

THE R. K. LEBLOND MACHINE TOOL COMPANY, CINCINNATI 8, OHIO

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- ★ **Easier Operation**

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Users claim several important advantages. By placing the master valves (A & B) at the cylinder (D), air supply and exhaust are speeded up appreciably. This in turn permits faster movement of the cylinder piston and materially increases production.

At the same time, the close coupling means that two lengths of large diameter piping between valve and cylinder—pipes continually filled and exhausted with non-productive air—are replaced

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by Arnold Kruckman

Washington Correspondent



Defense officials, off the record, say 'tis true some plants chosen to produce military equipment and material still are not at work. Particularly in point is the automobile outfit near Chicago which was to be producing long before 1 July. It is temporarily being reconverted to automobile manufacture. The puzzle has bothered many observers. Defense agencies themselves declare tool deliveries are chief reason for lagging defense efforts: that lack of tools stopped operation of new defense plants which fabricate tanks, guns and planes. They tell you this is the reason metals allocated to military jobs went into consumer goods. . . . Office of Defense Production insists there must be 50% increase in tool production by New Year, making tool industry billion dollar business. Machine and tool people have flatly told Washington brass that an increase 5.5 is not enough. They say they are expected to do business by guess and by gosh. If they overestimate they must make restitution in 60 days. There is no incentive. They urge the answer is to go back to prices prevailing before 25 January. Major General William Henry Harrison, happily now free of the mess, last February was told by tool people, output would lag under GCPR. Many others, even those near the Throne, were likewise informed, chapter and verse. But all those who constitute the high glitter and pageantry here continue dreamily to go along without paying any attention.

* * *

Air Force contractors, needing machine tools, have been invited by Air Force to come and get'em after 23 July at Dayton and Omaha where billions of dollars worth have been stored for years. There are grinders, millers, lathes, drills, routers, presses, brakes and screw machines. Contractor must make appointment to inspect. If he is a proven and valid Air Force contractor, or subcontractor, what he chooses is loaned and shipped pronto by the Industrial Equipment Section of Air Force Material Command. . . . Walter Reuther, CIO United Auto Workers' President, recently wrote President Truman and Defense Mobilizer Wilson, bottleneck of machine tools production may be smashed by Government if it would establish plants for assembly. He suggests contracts could be made with existing tool and die plants to produce component parts. . . .

* * *

Cynical persons on Government payrolls tell you CMP stands for "confusion more pronounced." It's the Navy snafu over again. Whatever they say, Walter C. Skuce, with title of Assistant Administrator for CMP, is sincere and utterly earnest. Recently, he told an interested group decentralization is the object. In July, field offices were told to process applications. Eighty percent applications filed take 15% of the metal required. CMP has staff of 50 specialists. Curiously enough they average 50

visits daily from taxpayers, and 100 telephone calls. They expect it will take more than a year to get going. The object is to use existing Government Agencies to do the work of NPA if, and when, NPA is reorganized. Obviously NPA will not be recognized until Congress passes a new controls law. It is Skuce's objective to do things on the dates that have been set for performance. He hopes CMP to be in full swing the fourth quarter. Object is to make CMP, whose operation was secret in 1942, a publicly functioning machine in 1952. Skuce admits there is a heap of control for a little defense program. Someone asked him if it wouldn't be wise to keep controls ad infinitum! "God forbid!" said Skuce. Real problems are right ahead, with the grass roots and Congress trying to wipe out all controls, and Korea undoubtedly in a state of spurious placidity. An amazing number filed their CMP requirements erroneously because they thought they were limited by NPA M-7, or M-12. There is clarification for the bewildered in M-47. Applications in June totaled over 43,000; 5000 additional received by 15 July, end of period for processing for September delivery of metals. First 10,000 received processed quickly, 8000 because they were from smaller firms and more easily handled. Applications came in at the rate of 250 a day.

* * *

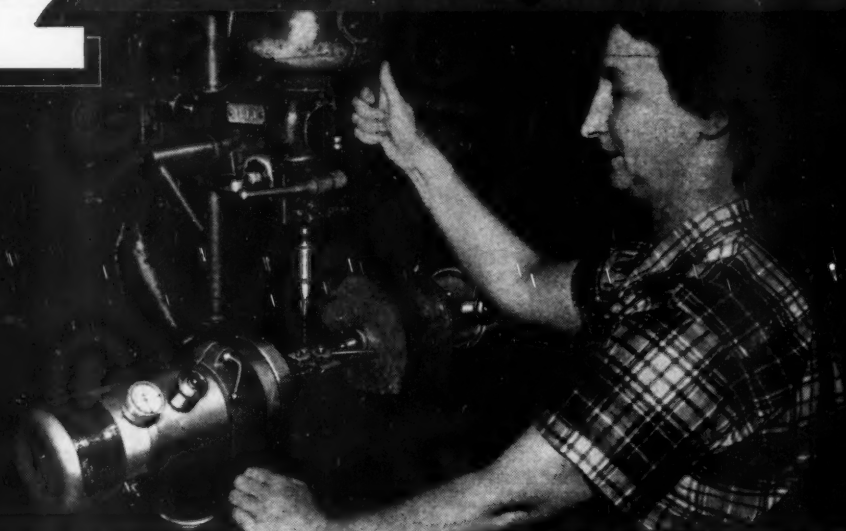
Britain, pleading for metals, told State Department it is preparing to establish copy of CMP by end of year. Its shortage of copper, steel, zinc, delays arms production. Britain set up special defense priorities. Sheet steel and tin plate, also copper, zinc, nickel and alloys not available unless absolutely essential. They ask us to share scarce materials of all kinds. Effect of probable truce yet undetermined here in relation to machine tools. No cancellations expected. In fact, increased orders seem in offing, on basis of defense program authorized by Congress. Boost in demand for metals, predicted as result of NPA in September. Current allotments run from 100% to 75% of amounts requested. Total allotments will be as much as volume of metals used in second quarter. If you use only five tons carbon steel, 500 pounds copper and 500 pounds aluminum, simply write CMP-SU on your metal orders and put them through. Do not apply to CMP. "Production Directive control" shortly to be used by CMP, will tell where each ton of metal goes.

* * *

Tungsten is the current Washington scandal. The Senate Armed Service "Preparedness" Subcommittee says we are "on the verge of tungsten starvation" because the Munitions Board and the Army were literally not on speaking terms. This is the Munitions Board preceding John Small's Chairmanship. Almost side by side, in the Pentagon, because there was a bitter feud, neither would tell the other about the nation's tungsten dilemma. Before Communists grabbed China we could have obtained liberal quantities of the mineral. The Senate now demands the agencies find a new process of making tungsten carbide; and that Government be the sole importer and reseller of tungsten. Tungsten (and molybdenum)

2

DUMORE DRILL HEADS cut multiple-drilling costs in half



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When using a standard drill, the operator must stop the drill, change bits, and start again. This is a tedious and costly process. The Dumore Automatic Drill Head solves this problem by allowing the operator to change bits without stopping the drill.

SOLUTION

The Dumore Automatic Drill Head is a revolutionary tool that allows the operator to change bits without stopping the drill. This saves time and money, and increases productivity. The Dumore Automatic Drill Head is the only drill head of its kind.

DOM 7

Would you pay \$200 to save \$5,000 a year . . . \$400 to save \$10,000? Sure you would. And that's the kind of savings users of small drills report that they are getting with the new Dumore Automatic Drill Head.

We can't tell you how much this revolutionary tool will save you, because we don't know your problems. You'll have to figure the savings for yourself. That's why we're urging you to write for the facts Today!

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came under international control early in July. Australia and Brazil refused to agree to prices. Agreement applies only to ores and concentrates. Further extension to primary compounds, salts and acids suggested. Part I of agreement allots both metals to member countries, covering import and domestic production; Part II schedules imports and exports; Part III establishes international price levels for tungsten only. General Services Administration set deadline for purchase of 3 million short tons tungsten to be not later than 1 July 1956. Government supports price at \$63 per short ton unit. . . . Scarce tungsten chiefly is now used for cutting tools. Chrome concentrates will be shipped to the U. S. stockpile beginning January 1953, and until January 1954 from New Caledonia. U. S. Treasury, through Lehman Brothers, (Senator Lehman (D., N.Y.) has established a credit of \$737,000, and ECA has supplied \$417,000 to be immediately available for the New Caledonians. The \$1,154,000 is the first of the sum to be supplied as prepayment for the product to be provided a year and a half in the future. . . . Tin also has caused whispering gossip here. Ambassador Harriman, now oiling the oil situation in Iran, trouble-shooter for Truman, recently criticized RFC Boss Symington and GSA Boss Larson for beating down the price of tin, stirring up trouble in Bolivia and Indonesia. The Indonesian Ambassador late June filed a strong protest with the State Department against the reduction of price of Singapore tin. Twenty-four hours earlier Bolivia complained bitterly. Both Governments claim fall in prices will seriously imperil their efforts to raise living standards; Bolivia threatened purchase of American cotton would suffer. Indonesia implied there may be labor unrest and possible revolution. Bolivia intimated similar conditions, suggesting loss of dollar income might upset Bolivian economy and society. RFC curtailed purchases and cut prices from \$1.80 to \$1.06 per pound. The all-time high reached on March 10, 1951 was \$1.83.

* * *

All consumers of copper, steel and aluminum, were ordered by CMP to file applications for allotments not later than 31 July. This means all production of consumer durables goes under CMP the fourth quarter. Field offices will process all applications for 100 tons carbon steel, 5 tons alloy steel, 500 pounds stainless steel, 4000 tons copper, 1000 tons aluminum. . . . During third quarter CMP allocated 18,835,000 tons steel. Motor Vehicle Division was largest NPA claimant. Steel output available totaled 20,825,000 tons; 3,400,000 tons were allocated to "free" areas. Autos and consumer durables had allocations 10% above expected pickups. Only 35% of any allotment may be obtained in any one month, except for construction whose needs are not constant. Demand for all metals is about 35% in excess of supply. While anticipated Korea truce is expected to slow defense preparations and metals are not expected to decrease in demand. . . . First allocation was 1,670,000 tons steel for direct-defense needs, 15,660,000 tons for defense support, and 3,380,000 tons for free areas. . . . Scrap is constantly falling in supply. Government explorers are hunting all over the country, even digging in debris.

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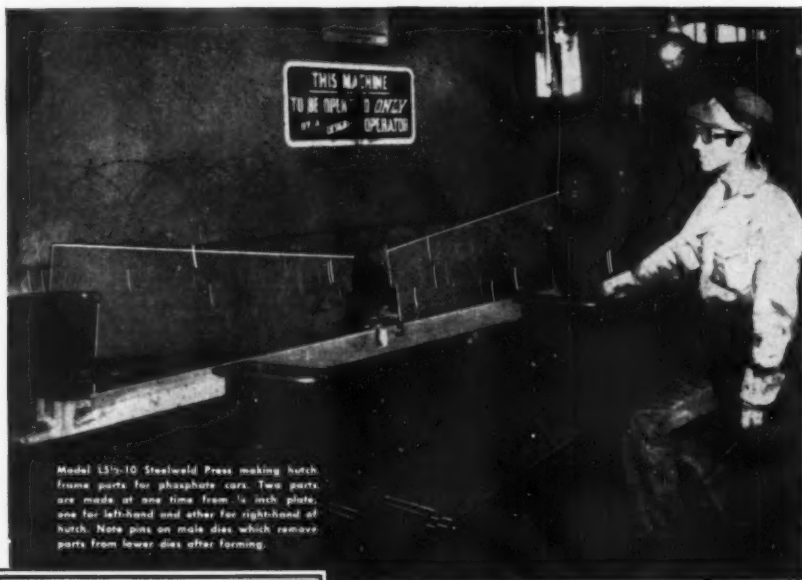
Send for Descriptive literature and price list on PRES-ON DISCS. Discs are available in $\frac{1}{2}$ " thru 20" diam., grits 16 to 600 mesh.



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Chicago, Illinois

PULLMAN-STANDARD FINDS MANY USES FOR STEELWELD PRESS



Model LS-10 Steelweld Press making hutch frame parts for phosphate cars. Two parts are made at one time from $\frac{1}{2}$ inch plate, one for left-hand and other for right-hand of hutch. Note pins on male dies which remove parts from lower dies after forming.



A few of the many parts produced within a short period on the Steelweld Press. Curves and bends of every shape and degree are formed quickly and accurately.

"The more we use our Steelweld Bending Press, the more we learn about what it can do for us", said the Day Superintendent of Pullman-Standard Car Mfg. Co., Butler, Penna. "As a result it is handling more and more of our work. We are doing a great many forming jobs on it that did not occur to us as being possible when we first installed the machine."

An endless variety of parts are produced on this press. These are mostly of $\frac{1}{4}$ and $\frac{3}{4}$ inch steel plate and involve curves and bends of every description for gussets, fulcrums, braces, frames, housings, etc. used in the manufacture of railroad cars.

The dies used are relatively simple and made in the company's shop. Because dies are easily changed, it usually takes about an hour to set up for a new job.

If you work with metal plate in any thickness up to one inch, for bending, forming or punching, you should get the facts on the many features of Steelweld Presses.

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CATALOG No. 2010 gives construction and engineering details. Profusely illustrated.



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MTBB

 HOW'
Breaking machine tool bottleneck

Defense Mobilization Director Charles E. Wilson today issued to a group of government agencies a directive designed to break the bottleneck in the machine tool industry.

The order called for assistance to be given the industry through the modification of price controls; procurement of adequate facilities, materials and components; easier financing; pooling of orders and encouragement of subcontracting to assist the small manufacturer; and overcoming manpower shortages. The agencies to which the directive was sent are the Defense Production Administration, National Production Authority, Economic Stabilization Agency, General Services Administration, Department of Defense, and the Atomic Energy Commission.

Mr Wilson pointed out that although the Munitions Board estimates that \$2,900,000,000 of funds available for military production will be required for metalworking tools by the end of June 1952, the industry is currently operating only at an annual rate of \$675,000,000.

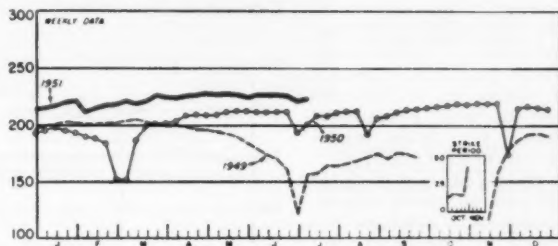
"The cost of the delay waiting for machine tools will far exceed the cost of the tools," Mr. Wilson stated.

General business indicators

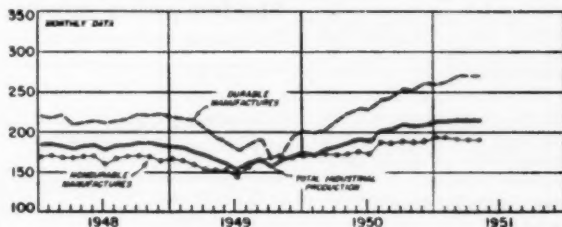
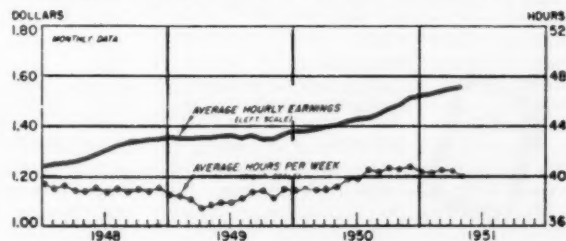
source: Dept of Commerce

Steel-ingot production

(1935-39 = 100)

**Industrial production**

(Seasonally adjusted, 1935-39 = 100)

**Hourly earnings and hours in manufacturing**

He said OPS price adjustments on new metal-working tools would give more equitable treatment to the industry which has been hard hit since the end of World War II. Stimulus would thus be given the industry to expand production for essential needs.

He asked DPA to initiate steps to increase the amount of money available for pool orders and issue pool orders where necessary to direct production and encourage extensive sub-contracting. He asked that 30 per cent advance payments be made, if necessary, on pool order contracts. Administration of pool orders would be concentrated in NPA.

He called upon NPA to give the necessary help to producers in obtaining facilities, materials and components; to encourage sub-contracting in areas where slackened civilian production has caused labor layoffs, and to encourage the use of used and idle tools to lower the demand for new tools.

The directive said adequate manpower will be assured producers of machine tools by ODM manpower policies.

Idle metal-working machines

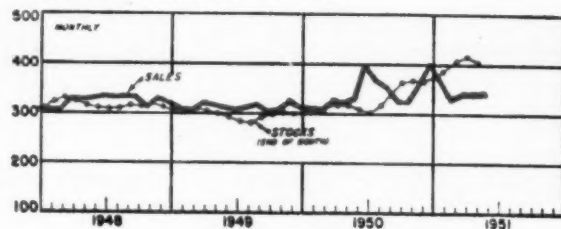
The National Production authority, U. S. Department of Commerce, is planning to set up an "information center" where manufacturers with idle metal-working machines will be notified of sub-contracting opportunities from machine-tool builders.

This was disclosed today at a meeting of the Graphic Arts Equipment Industry Advisory Committee with NPA officials.

The proposed "information center" would be part of the Metalworking Machinery

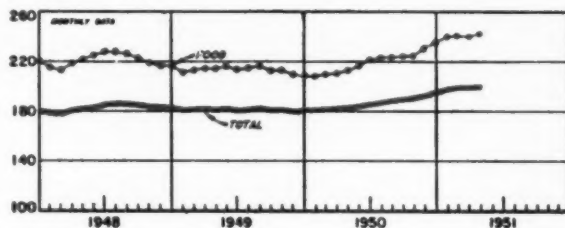
Department-stores sales and stocks

(Seasonally adjusted, 1935-39 = 100)



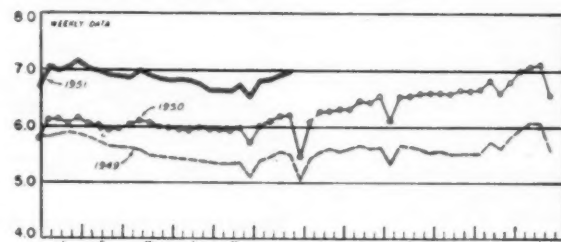
Consumer's prices

(1935-39 = 100)

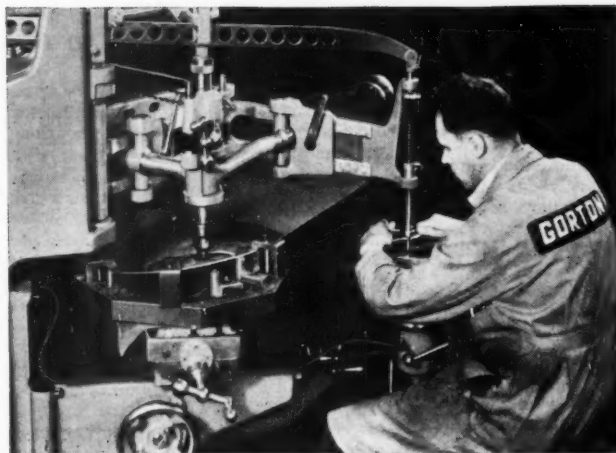


Electric-power production by utilities

(Billions of kilowatt-hours)



Branch, General Industrial Equipment Division. Committee members reported conversion of up to 50 percent of production to manufacture of military and military-supporting goods. The graphic arts equipment industry operates metalworking machines and foundry devices to produce printing and publishing machines and presses.



Tracer-Controlled Pantograph cuts and rounds thermal slot in 8-foot steel propeller blade in 40 minutes; previous time was 5 hours, 10 minutes — just one of hundreds of examples of time and cost saving with tracer-controlled Pantograph machines.

Special Machine Tools Speed Production During Rearmament

by
GEORGE GORTON III
Executive Vice-President,
George Gorton Machine Co.

INDUSTRY'S foremost responsibility right now is to produce faster, to highest quality standards and at lower cost — whether on defense contracts or for our civilian needs.

Today, there are literally thousands of operations being performed throughout industry which can be speeded up, improved in quality and lowered in cost by the use of available models of special machine tools. The modern tracer-controlled Pantograph machine is such a tool. It is both a special purpose machine, ideal for short runs, and it is an accurate single purpose machine which turns out identical parts or pieces to meet tight production schedules.

The tracer-controlled Pantograph machine is used for inside and outside profiling, routing, die sinking, mold cutting, counterboring, contour milling, chamfering, grooving, graduating and engraving in ferrous and non-ferrous metals, as well as in plastics.

This machine performs on flat, uniformly curved, cylindrical, spherical or

irregular shapes — it works in either 2 or 3 dimensions, in all directions on a horizontal plane, and vertically. It employs enlarged masters, templates or patterns which are quickly and easily made and operates normally at a reduction ratio thereby increasing accuracy — exclusively characteristic of the pantograph.

Single or repetitive accuracy — from one piece to thousands — manual or full automatic operation depending upon quantities — work sizes from the size of a dime to as large as 10 feet.

A new booklet, "Pantography," explains the process and shows what this type of machine can do for you. It is yours without obligation. Write for it today. If interested, also ask for our latest General Catalog 1655. Address the George Gorton Machine Co., 1409 Racine St., Racine, Wisconsin, U. S. A.



Machine tool prices

The Office of Price Stabilization permitted machine tool manufacturers, in determining ceiling prices, to include cost increases resulting from more use of overtime and shift premium labor and subcontracting.

The action is accomplished by Supplementary Regulation 2 to Ceiling Price Regulation 30, the OPS machinery order.

OPS issued the supplementary regulation, which modifies CPR 30 only in this basic respect, because it is believed the machine tool industry's production goal cannot be realized without extended use of sub-contracting, as well as overtime and second and third shift labor, a method of operation which will greatly increase production costs.

Defense procurement agencies have requested maximum use of these operation methods in spite of higher costs, OPS pointed out, in order to bring the industry this year to a \$1,000,000,000 annual output rate as a firm mobilization base. In March the machine tool industry was producing at the rate of \$432,000,000 a year.

Within the past five months, so many orders have been placed by the armed services and military goods producers that the average delay in machine tool delivery is 20 to 22 months, the agency said. In recognition of the defense priority of machine tool output, the National Production Authority recently required manufacturers to reserve 70 percent of their production for the armed services and specified contractors.

Today's OPS order provides that manufacturers may reflect in their ceiling prices for machine tools and machine tool attachments increases in their costs resulting from more overtime and shift premium hours and more subcontracting since the end of their base pre-Korean base period. This is not permitted generally for makers of machinery and related manufactured goods which fall under CPR 30.

Higher costs for overtime and shift premiums may be reflected in ceiling prices by modifying the method of determining labor cost adjustments under CPR 30. Higher costs for sub-contracting are added to ceiling prices determined under the regulation.

Prices may be redetermined periodically to reflect the permissible increases. Redetermined prices do not have to be reported

to OPS after the date of initial filing of reports under CPR 30.

Complaints from small business

Smaller tool and die employers complained to Congress, War Stabilization Board controls freeze depressed pay rates so the smaller people can't compete with the Bigs to get skilled workers. Shortage of skilled workers is increasing. They ask agencies to grant relief on area, employer or industry-wide basis. Congress feels the present Wage Board should be abolished when the defense production act is finally adopted. Wage Stabilization Board, 13 June, established "National Enforcement Commission" to compel compliance with WSB Regulations and to prevent or penalize illegal wage payments by employers. The Board provided, in the event of any violation, all Agencies and Departments of Government shall disregard and disallow the entire amount of payment that may be due from Government to the violator. U. S. Department of Labor reports, while many industries have shown employment decrease, machinery and allied industries have continued to show gains. The hiring rate is reported as relatively high in primary metals, machinery and allied industries. National Labor Relations Board, in the Printz Leather Company case, ordered that an employee who had produced more than his fellow workers, and who was discharged on complaint of the Union steward, must be reinstated with full payment of back pay jointly assessed against the employer and the Union.

Here and there

Army has appointed 200 small business specialists in 33 states to find small business sources capable of taking part in contracts for Army. Will assist Federal, State and private agencies in making inventory of facilities of small concerns. . . . Washington still is talking about the Congressman, Representative McGregor (R., O.), who doubted whether \$13 million was sensible for an Air Force installation in his Congressional District. Defense Secretary Marshall protested it was very necessary. McGregor has gone to Ohio to find out. . . . Harry E. Blythe, President, and owner of STD, Inc., small concern which makes stampings, tools and dies, at Alliance, Ohio, has been appointed Consultant on Small Business for the Army. . . .



Precision Rod Cutting at High Speed

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The DI-ACRO Rod Parters further increase the applications of "DIE-LESS DUPLICATING" as a cost cutting, time-saving production technique.

Do you require precision—DI-ACRO Rod Parters hold tolerance to .001" on duplicated cuts. The ends are square, and roundness is maintained.

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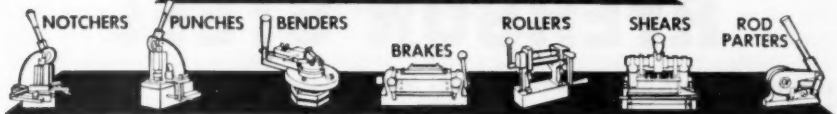
GET "DIE-LESS DUPLICATING" CATALOG!

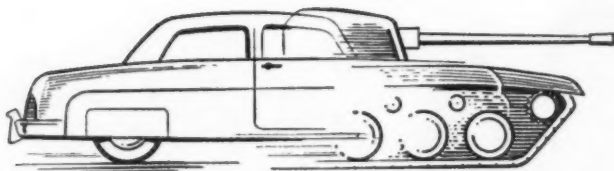
Shows parts duplicated by DI-ACRO Benders, Brakes, Shears, Rod Parters, Rollers, Notchers, Punches.

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The defense program requires conservation of strategic metals—so, as in the last war, alloy steel analyses are changing. Some standard alloys are still available. But many new, or interim, analyses are already on the market. Others are on the way.

Today more than ever, under these changing conditions, the safest way to buy alloys is on the basis of analysis and hardenability rather than on analysis alone. When we know the hardness or tensile strength you need, we make absolutely sure that the alloy you receive meets your requirements—even though it will be many months before standard hardenability ranges of the new steels are established. Here is how we do it:

We carefully test each and every heat of as-rolled and annealed alloy steel in

our stocks. This gives us actual knowledge of the hardenability of every bar of Ryerson alloy. Thus when you specify on a hardenability basis you can be sure the alloy you get from Ryerson will meet your requirements. And you can also be sure of getting the desired heat treatment results because the test information and other helpful data to guide you come with the steel.

Not every company makes these tests, records this information, but Ryerson does—and at no extra cost to you. It's all part of a service system called the Ryerson Certified Steel Plan. So during this confusing period, order by AISI and SAE number if you wish but also specify hardenability and be doubly sure. Though some shortages are inevitable, we will do our level best to supply the alloy steel you need.

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Interesting set-ups and machining operations in Southern Pacific RR shops

by Gerald Eldridge Stedman

THE REPAIR and maintenance of railroad locomotives and rolling stock is not generally considered as involving production; however, at the Southern Pacific Railroad General Shops at El Paso a variety of special and peculiar parts in a number of metals are constantly in production.

The brass department in the machine shop at the El Paso general shops has a very complete and effective set-up for performing the various machining operations on locomotive parts. Such parts are in great variety and number when it is considered that the Shops work on locomotives regularly of all types, including the 4200 Class articulated consolidation (mallet) type of 6000 hp., an oil burner designed by Southern Pacific engineers.

Charles Frederick, machinist, examples the designing and tool making skills that are somewhat general among the Shops' machinists. Perhaps 300 tools of Frederick design are stored in a revolving, hexagon multi-shelved steel cabinet in easy access to all in the brass department. This cabinet has glass panels for storage of various jigs and fixtures, together with tools and finished product reference for each machine set-up. The tools stored here are time-saving devices, and have increased production over previous methods on ordinary brass box lathes.

Examples of these time-saving devices stored for quick use, see figure 1, sketches a, b, c.

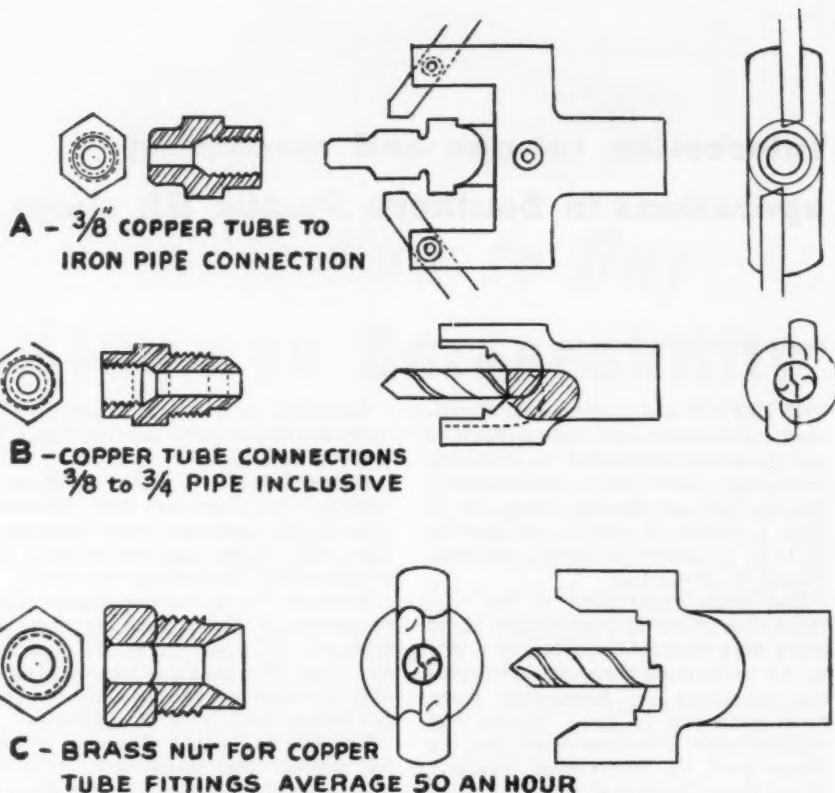
Example (a) is a copper tube connecting nut. There are five different sizes of this particular type brass nut. The body of the box tool is made to accommodate the various size tools.

Example (b) is another copper tube connector, of which there are three of each size, $\frac{3}{8}$ " copper to $\frac{1}{4}$ ", $\frac{3}{8}$ " and $\frac{1}{2}$ " iron pipe; this same combination being also arranged for various sizes of copper tubing from $\frac{3}{8}$ " to $\frac{3}{4}$ " inclusive.

Example (c) is that of a brass fitting for copper tube connections. This is simple, yet if made singly, would represent a slow production process. With this type of box tool together with $\frac{7}{8}$ " Landimatic die head, and stops on the turret, it is common to average 50 pcs. per hour.

Gage cocks commonly used for determining the water level in locomotive boilers are made up in large groups and carried in stores stock. These are completely formed and finished with forming cutters and Landimatic die heads, ready for assembly.

S. P. conducts a continuous safety education program which has produced fine results, lost-time accident rate being 1/1,000,000 man hours. Much use is made of illuminated signs above particularly hazardous machine operation.



1. Examples . . . of time-saving devices in use at the El Paso shops.

I noticed a unique safety guard for boring mills which does not permit the mill to run until completely enclosed, figure 2.

Much use is made of indicators; on turret lathes, for example, speed and feed indicators are installed which, when turned to the diameter of the work in the machine show feed and speed necessary to operate when working various kinds of metal, figure 2. Grinding machines have indicators showing proper surface speed in feet per minute for various diameters of grinding wheels, figure 3.

An interesting turning operation of a locomotive main crank pin is performed on an Axleson 25" engine lathe of late design. All of the driving axles and crank pins are machined at the El Paso Shops. Before this machine was placed in service, two men were required to perform the work. With the use of carbide tools and coolant efficiency, this lathe cut operating costs more than half, figure 4.

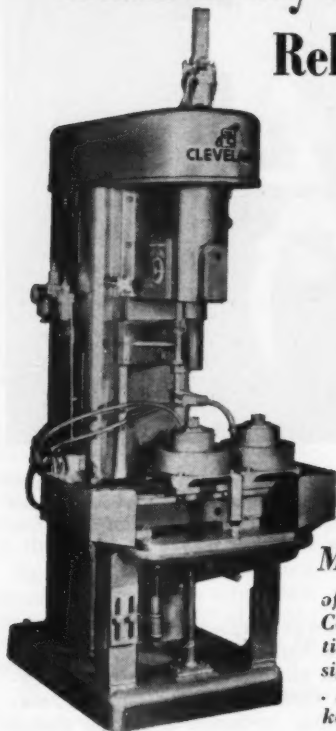
Mr. Sanders has devised several ring and plug gages together with tools which enable him to perform this class of work with ease. The material is

CLEVELAND tapping machines

lead
screw

When Every Hour Counts...

Rely on Cleveland Tappers

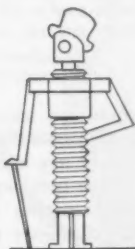


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set up on a munitions job,
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Buttress thread in SAE
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to 35 to 37 Rockwell.*

Production hours saved can become pretty important in a defense program ... and Cleveland Tappers save production time...turn out more perfect pieces per hour. They cut tapping costs by combining operations ... turn semi-skilled workers into skilled operators. Cleveland engineers can design a machine for your needs which will not only combine several operations but also tap groups of holes at one stroke of the machine. If you have a production problem check with Cleveland FIRST.

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of The Cleveland Tapping Machine Co. Mr. Lead Screw symbolizes the time-proved lead screw feed designed and pioneered by Cleveland ... now generally accepted as the key to precision tapping at high speeds. Write for your copy of the Cleveland Production Tapping Guide and a copy of Catalog MB-1



THE CLEVELAND TAPPING MACHINE CO.

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2. Bullard vertical turret lathe . . . Notice speed and feed indicators. When it is turned to the diameter of work in the machine, it shows feed and speed necessary to operate the machine for various kinds of metals. In foreground, a unique safety guard for boring mills; another evidence of safety caution in the shops.

vanadium axle steel. The work varies in diameter from 7" to 14" and machine speeds are maintained to average 250 surface fpm. with $1/32$ " feed. Sometimes, requirements demand the removal of $1\frac{3}{4}$ " diameter of stock in one cut, with $1/64$ " feed, maintaining 300 surface fpm. One job in machining the center pin for a 3-cylinder engine, using carbide tools at $1/64$ ", taking the cut down from 12" to $10\frac{1}{4}$ " O.D., formerly took 10 hours of machining time.

The age-old practice of machining the piston-type valve rings so they will have a perfect circle finish after they

have been assembled in the valve chamber has had a variety of machining methods, all of which have been satisfactory. However, V. B. Cantwell, machinist, has perfected a unique design for finishing the "Z" and "L" type rings complete from rough casting to the finished ring, in one operation, figure 5. This is done by first splitting the tube with $1/4$ " cutter and closing the casting in the chuck, using a $\frac{3}{8}$ " x 1" steel band to hold the tension on the rings.

Boring and turning as illustrated, leaves the ring ready to be cut off with the box tool, the cutters of which are so

'ROTOR SCREW DRIVERS

'MAGNETIC BITS

"PAID OFF" IN ONE WEEK

THIS manufacturer of metal cabinets found a lot of time was being taken to insert and drive screws in locking bars with hand screw drivers. Some screws were loose, others so tight that bars buckled, others were difficult to reach.

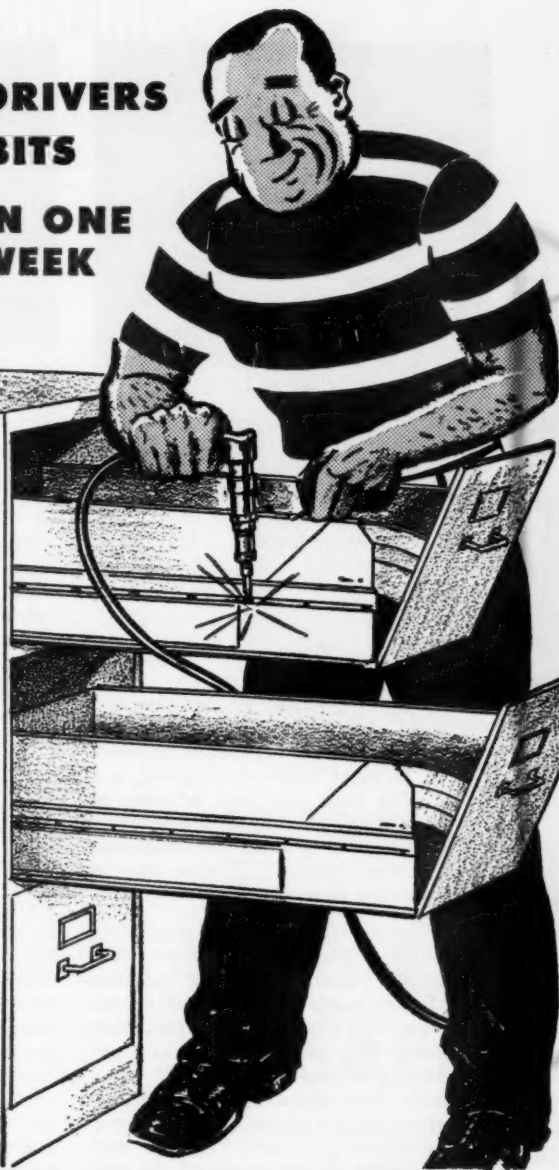
The Rotor Application Engineer suggested Rotor Midget Screw Drivers that have double-cushioned clutch (for torque control) and magnetic bits (to hold screws in while inserting in the hard to reach places.)

Results? Over 40 man-hours saved per week. The labor savings *alone* "paid off" the tool costs in the unusual time of *one week*.

Want to study *your* methods for similar benefits?

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THE ROTOR TOOL CO.

CLEVELAND, OHIO

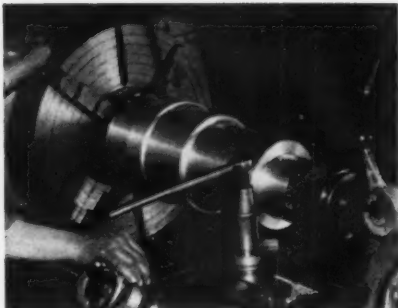
**HIGH
CYCLE**



3. All grinding machines . . . have speed indicators detailing the proper surface speed in feet per minute for various diameters of grinding wheels.

spaced as to give the proper size and shape of the desired ring. With this set-up it is possible to produce an average of 30 rings finished complete in 8 hours. The bore and turn is made at the same time. The use of the box tool makes the step cut on the ring and cuts off the finished "Z" type ring in two operations on the one machine.

The set-up for properly machining aluminum driving box oil cellars on a No. 5 HP Cincinnati milling machine uses Shops made fixtures and represents an advanced type machining operation. The cellar is held in a jig which rotates and locks in full equal positions, thus allowing all planing operations to be done at one setting. This positioning is held in place with one set screw in the center of the post and two small clamps at the base. These hold the cellar rigid without binding, thereby insuring a milled, true surface



4. A locomotive main crank pin in a 25" engine lathe . . . With the use of carbide tools and coolants, efficiency on this machine has cut operating costs in half.

to conform to check gage sizes.

This jig is used universally as an angle plate and with accessories to machine the various parts of locomotive valve motion, figure 6. The jig was designed and built by Frank A. Fuentes, machinist.

A very efficient arrangement is milling the multivane type locomotive crosshead true with the piston rod fit on an adjustable mandrel. This is accomplished, using conventional gang cutters on a No. 5 Hp Cincinnati milling machine, figure 7.

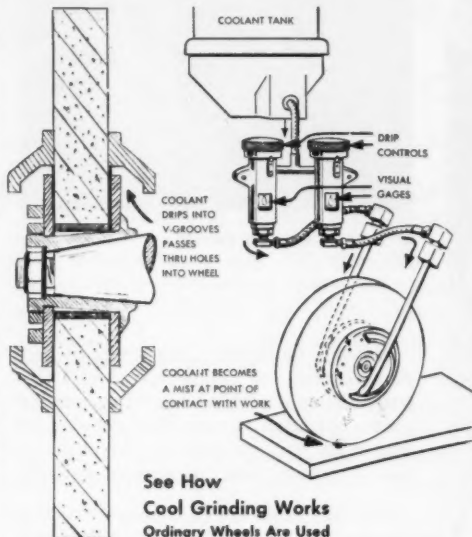
The machining of a steel ball and bushing on a 36" engine lathe for flexible radius bar connecting the two units on an articulated consolidation (mallet) type locomotive, is shown in fig. 8. They have achieved very good results on this job by first machining the ball case hardening, and finish grinding thereafter. The bushing consists of two halves. After being machined a hard surface metal is applied and ground on the inside to 1-128" larger than radius of the ball. The two finished halves shown on the bed of the lathe in figure 8 are finished on a different jig, using the same attachment with some modifications.

DoALL "COOL GRINDING"

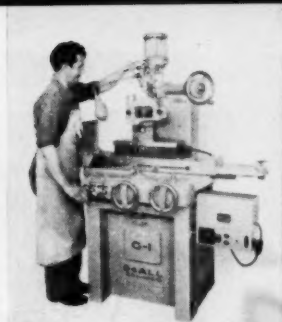
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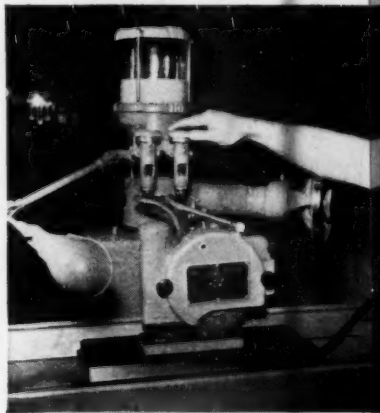
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GR-35

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*"I told you not to let him in! He has
a grip like a JACOBS CHUCK!"*



The Jacobs Manufacturing Co., West Hartford 10, Conn.



5. This unique jig design . . . finishes the "Z" and "L" type rings complete from rough casting to the finished piston type valve ring in one operation.

Antonio de Stefano, machinist, is responsible for the perfection of this fixture, using a milling machine circular plate actuated from the cross feed screw on the carriage of the lathe to rotate the tool post and electric grinder.

The El Paso Shops make very extensive use of Magnaflux in checking piston rods, crank pins, connecting rods, even magnafluxing the main crane hooks with which the Shop bays are facilitated, and the swing crane hooks that accommodate most of the machine tools.

The main tool rooms of the El Paso Shops have 22 tool makers and three apprentices. Most of the tool makers are Latin-Americans. Mr. Reid, in his constant emphasis of happy working conditions has caused the introduction of color into the tool room to effect not only a pleasant atmosphere, but definite advantages in both safety and care of machines. The machine tools of the main tool room are brightly painted. A warm brown floor is toned in white striping. Much use is made of focal orange and focal yellow. Machine tool



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You know—it's really surprising how many difficult milling operations can easily be handled by Kemp Smith Standard Attachments mounted on a standard milling machine.

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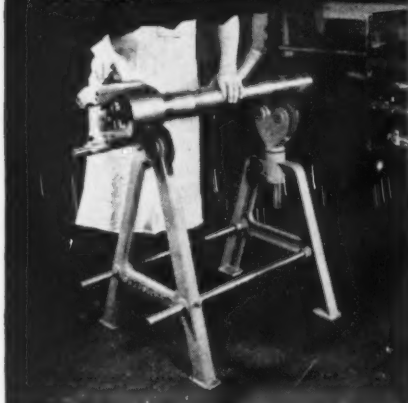
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Swing	CAPACITIES	
	Between Standards	Weight Capacity
21 in.	20 in.	12 lbs.
21 in.	20 in.	800 lbs.
43 in.	29 in.	800 lbs.
43 in.	29 in.	2,000 lbs.
6 ft.	5 ft.	5,000 lbs.
8 ft.	8 ft.	10,000 lbs.
Any	Any	24,000 lbs.
43 in.	30 in.	800 lbs.

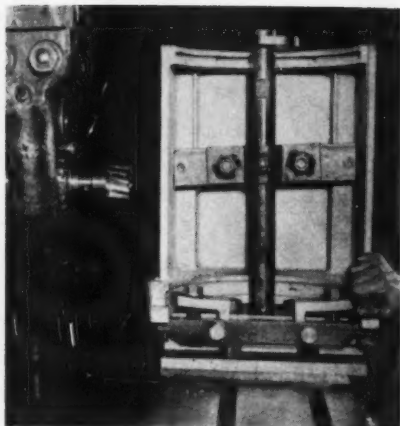
FREE DATA



You can obtain complete information on Sundstrand Balancing Tools by writing for bulletin 511.



SUNDSTRAND MACHINE TOOL CO.
2535 Eleventh Street, Rockford, Ill., U.S.A.



6. A jig set-up . . . for properly machining aluminum driving box oil cellars on a No. 5 Cincinnati.

bases are brown; guards are yellow; upper structures are green; motors are buff.

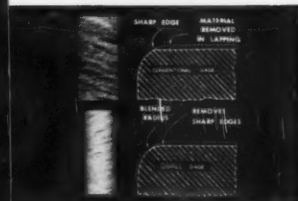
In the boiler tool room, apart from the main tool room, all tools and motors of issue are painted in cheerful red and contrasting black. This has not only made boilermakers more proud of their tools and therefore more careful of them, wiping them off after use, but it has prevented much tool loss, lessened tool breakage, made for better tool control through a more effective visual check system.

The boiler tool room is in charge of L. Rivera, who also personally takes charge of the centralized tool grinding operations. In most shops, boilermakers take care of their own tools. At the El Paso SP Shops, through centralized tool grinding and repair, this individual boilermaker attention to tools is eliminated with consequent major improvements in safety records, particularly the elimination of eye accidents.

The El Paso S.P. Shops are under



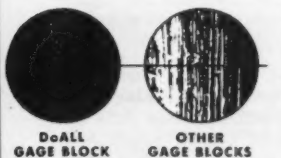
COMPACT CASE—They can be carried in your pocket; are easier to handle.



BURR-PROOFED—An exclusive process removes the edge burr left by lapping to give longer life, greater accuracy.



INDIVIDUAL CONTROL NUMBERS—Every block is numbered to keep sets matched, records accurate.



SUPER-FINE SURFACE FINISH—The primary reason why DoALL Gage Blocks last so long. Note the comparison.

COMPLETE LINE OF ACCESSORIES—DoALL-developed accessories multiply Gage Block usefulness a thousand-fold.



These Exclusive DoALL GAGE BLOCK features mean Better, Low Cost, Quality Control

DoALL Gage Blocks are adaptable to literally thousands of critical inspection jobs. For example, with one set of 83 blocks and a few accessories you can quickly make 120,000 different snap gages for about 1/4 cent each! And you have micro-inch accuracy. DoALL Grade AA Gage Blocks are accurate to plus or minus two millionths of an inch; Grade A to four millionths; Grade B to eight millionths.

Use them for checking other instruments and finished parts. You cannot buy finer inspection equipment. DoALL Gage Blocks last longer, are easier to use, cost less in the long run than any others. Ask to see DoALL Gage Sets at your plant—your local DoALL Sales-Service Engineer will demonstrate them for you.

THE DoALL COMPANY, 254 North Laurel Avenue, Des Plaines, Illinois

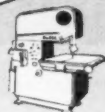
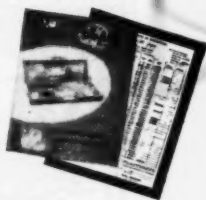
MODERN MEASUREMENT CONTROL

Send for this new 20 page Bulletin describing DoALL Gage Blocks and Accessories. Ask about DoALL Calibration Service for your present gage blocks!

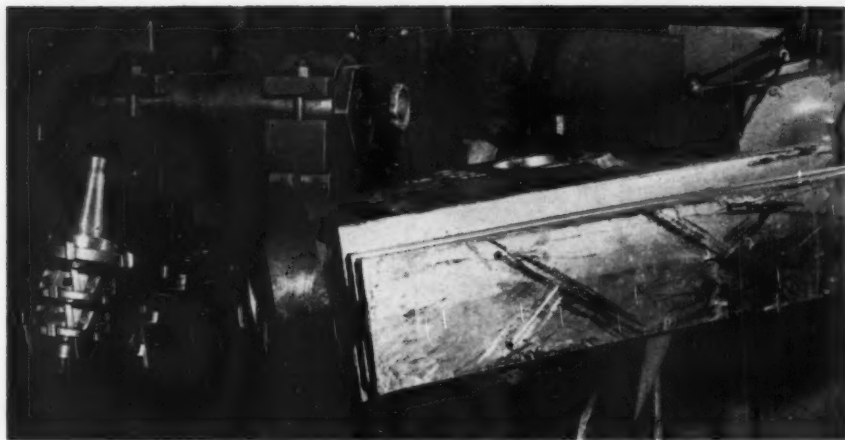


27 Sales-Service Stores . . . Industry's New Tools

GB-25



Machine Tools . . . Gaging Equipment . . . Tool Steel . . . Band Tools . . . Metal Working Supplies



7. Using the conventional gang cutters . . . on a No. 5 Cincinnati. An effective arrangement is here shown for milling the multi-vane type locomotive crosshead true with the piston rod fit on an adjustable mandrel.

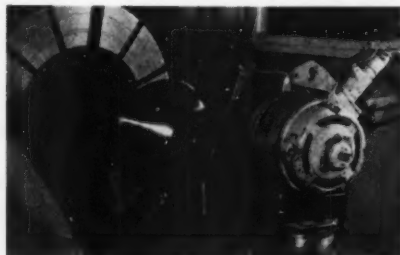
the direction of W. G. Reid, superintendent of motive power, and O. H. Gutsch, superintendent of shops. General machine shop foreman is S. H. Ehrenstein.

Southern Pacific Company rules provide that suitable eye protection will be afforded for the various types of machine work in the shops which accounts for the remarkable record estab-

lished with respect to eye injuries in El Paso General Shops. Because of this rule, for photographic purposes in lieu of including eye protection, machinery was stopped so as to preclude any possibility of injury to those shown in photographs.

The End

8. Machining steel ball and bushing . . . on a 36" lathe for flexible radius bar connecting the two units on an articulated Mallet-type locomotive.



New NESTING TYPE TOTE PANS

20" Long x 12" Wide x 6 1/4" Deep
16 Ga., drag holes, handles both ends.

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Results obtained through many years on work of wide variety have established the Logan Lathe as a production tool. Industry chooses and uses more Logan Lathes than ever because Logan versatility, efficiency, durability and economy pay off in profitable production.

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Less than .0005" spindle runout 12" from the bearing . . . two V-ways and two flat ways precision ground to within .0005" variation . . . these are typical Logan Lathe construction tolerances.

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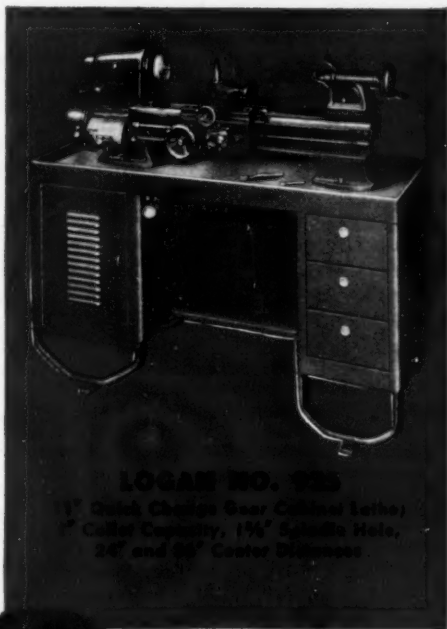
The Logan Lathe gives you spindle speeds of 45 to 1500 rpm with no bearing adjustment. A complete line of accessories further equips these versatile tools for every type of lathe operation.

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With its ball bearing mounted spindle, its self-lubricating bronze bearings at vital wear points, and its rugged overall construction, the Logan Lathe retains its accuracy and dependability under constant use.

ECONOMY . . .

By reducing power costs; by saving vital floor space; by quick, easy set-ups; by lasting accuracy and low maintenance; Logan Lathes put many metal turning operations on an economical and profitable basis. The saving to be realized on your original investment in Logan Lathes is a further economy well worth considering.



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1" Quick Change Gear Collet Lathe;
Collet Capacity, 1 1/4" Spindle Hole,
24" and 36" Center Distances

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Using a movie camera in setting and selling production standards

by Harold R. Nissley

Present day methods of setting production standards

There are at least five distinct methods of setting production standards today: 1. Guess (By the foreman and/or superintendent); 2. historical comparison (by foreman and/or superintendent); 3. single time study with its arguable rating or levelling (by an experienced industrial engineer); 4. multiple time studies and resultant standard data (by one or more industrial engineers covering a number of operators); 5. one of the tabular systems of synthetic time values (Work factor, Methods Time Measurement, or Methods Time Analysis).

Strangely enough each one of these five methods works and can be defended when applied under the proper set of conditions. It would be foolish to use even a single time study to establish a piece work production standard on a job that has but a few hours to run; most experienced industrial engineers will go along with the guess of a foreman or superintendent in setting a standard on a job that has less than a day to run. There are a few small job shops that can afford the luxury of standard data particularly when their jobs change daily and are seldom the same from one week to another. The astute management or

industrial engineer should be able quickly to size up a situation and indicate what method of setting a standard is best for a given situation.

Setting the production standard versus selling the standard

As everyone knows, it is one thing to set a standard which management believes to be correct and it is another thing to convince the operators of the fairness of the standard. Moreover, how sure are you that you are right even after timing and re-timing the job? The answer is that you are never 100 per cent sure; all you can hope for is better than a 90 per cent batting average with deviations within the plus or minus ten per cent tolerance zone that most industrial engineers attempt to operate within. But what about the remaining 10 per cent of the standards that may be as much as 50 or even 100 per cent off? It is this remaining 10 per cent that accounts for 90 per cent of the piece work grievance time.

Obviously, the best way to convince an operator or group of operators of the fairness of your standard is to let them prove the fairness to themselves. There are several ways this can be done: 1. By a production run demonstration by the time study engineer; obviously, this cannot be done in most

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cases because of the necessary skill required of the job and developed by the regular operator. 2. By a production run demonstration by the operator(s) himself using nothing more complicated than the wall clock to time the batch; the writer has found that most operators will put forth an honest effort to find out the production facts, if properly approached. 3. By sitting down with the operator(s) over an eight hour period and showing him how he spends his time; it's surprising, too, how much the time study engineer learns about the job when he stays with it longer than the conventional 20-30 minute time study observation. 4. By taking a 4 to 8 minute moving picture of the operator(s) and analysing the pictures with the foreman and the operator(s).

The writer has used (and still uses) all four of these methods. Like the setting of standards above, the prevailing conditions will determine to a large extent which method is employed. Obviously, a \$10 four-minute movie would not be employed where a job has less than a month to run and where only one or a part-time operator is employed. But where a job has several months to run and where more than one operator is involved and the cycle time is less than one minute, then a low-cost 16mm movie is an excellent sales tool for many reasons.

Advantages of movies in standards setting

Movies have been used a lot for work simplification in foremen's meetings and other places. Unfortunately, only part of the real good has come from such movies where time values have been omitted.

There are several advantages to movies taken primarily for work measurement purposes.

1. If the movies are taken at standard silent speed (16 frames per second) by a good camera (spring wound or electric motor driven), then each movie

frame is worth roughly 0.001 minutes (or more exactly 0.00104 minutes). Thus, regardless of what system is used, if a good normal operator(s) has been filmed, the entire cycle time as measured by the frame count and multiplied by the foregoing constant can be ascertained and used as a **check against the time study, standard data, or tabular synthetic values** applied to the job. Certainly, this "**seeing-is believing**" technique is more convincing to the operator(s) than the most sincere recital of time study facts or other engineering data.

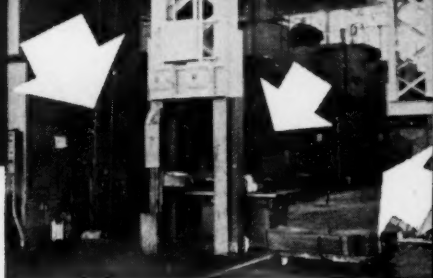
This has been clearly demonstrated to the writer at least four times within the last six months. A certain job shop employing 900 people was testing the efficiency of the Work Factor system on five of its older jobs with known production expectancies. The Work Factor figures came within four per cent on three of these jobs but was 30 to 40 per cent high on two others. Even conventional single-study time study could do better than this.

Instead of taking two hours to check these synthetic figures which were supposed to coincide with the production histories of these two jobs, it took less than 10 minutes to check the jobs by movie frame count (the movie frame count of the normal operators shown in the picture coincided within three per cent of the Work Factor figure; this visual demonstration, of course, was far more convincing than several recalculations).

Perhaps the most dramatic proof of the movie camera technique came about more recently when a Work Factor analyst came up with a figure of 30,000 an hour for an old inspection job (always difficult to appraise) and where the average for years had been 10,000 per hour. The movie frame count on several normal operators yielded figures ranging from 31,000 to 32,000.

The irony of this situation was the

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automotive press plants

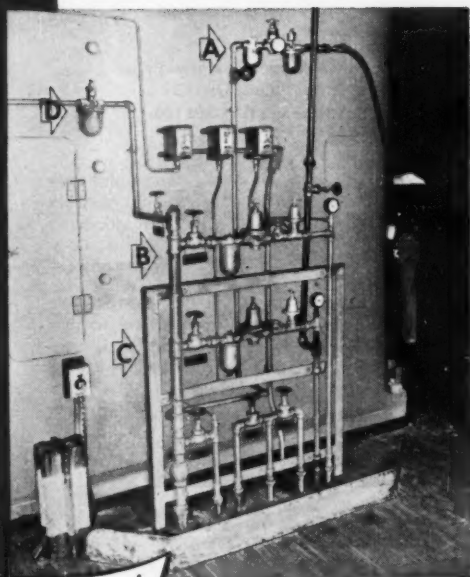


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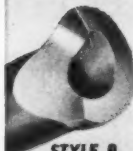


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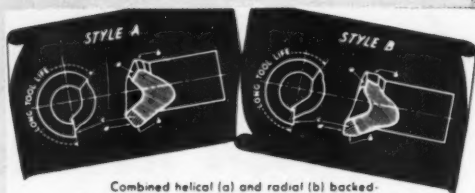
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In range of sizes to bore holes from $\frac{1}{16}$ " dia. up. To extend further the already long life of Bokum Tools, we recommend the Resharpening Fixture, Cat. H-AB1 and H-AB412. Tool holders, vertical adjustment and fixed position, Cat. H-483.

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company had developed a new method in which they hoped to triple their inspection. This development caused the scrapping of \$20,000 worth of old equipment and another \$10,000 was spent for the new device. The new method was Work Factor analysed, the final figure being 90,000 (not 30,000 as the company had set when it introduced the job). Here, again, the 200 per cent variation between the anticipated or actual and

the synthetic was too great for anyone to believe; but the movie frame count was the final clincher—89,000.

2. Much finer job breakdowns are possible with the motion picture camera than with the decimal minute stop watch. There are few time study engineers who will attempt to break a job down finer than 0.03 minutes and even at this figure will confess that the margin of error is considerable between

Waldes Internal Grooving Tool

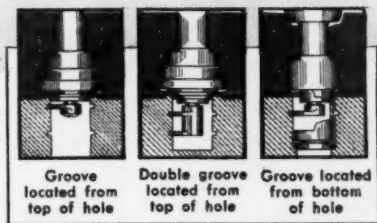
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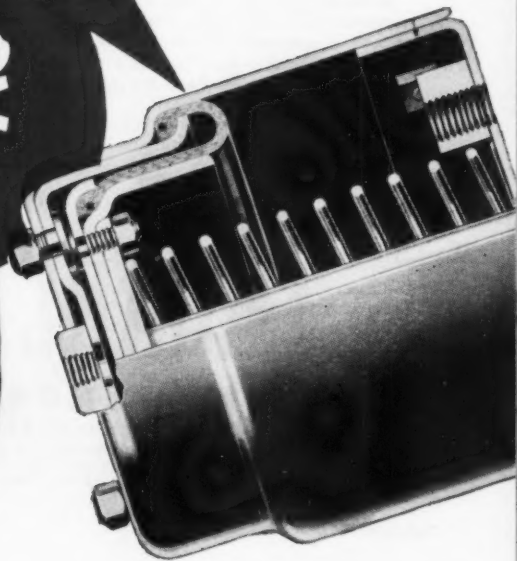
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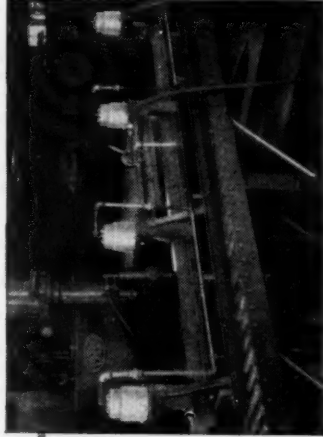
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FOR HOLDING, CLAMPING, BENDING, SWEDGING, STAKING, RIVETING

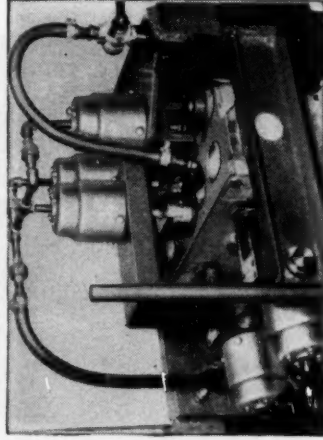
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THE INDUSTRIAL AIR CONTROL OF A THOUSAND USES



REDUCES OPERATOR FATIGUE

Four Rotochambers installed on the fixture in this spot welding operation replaced cumbersome hand clamps, saving time, greatly reducing operator fatigue.



SPEEDS INSPECTION METHODS

Installation of Rotochambers on this water test operation for engine castings eliminated hand operated fixtures, thereby speeding inspection and cutting costs.



Six to ten times faster than conventional air cylinders, the Bellows Super-Speed Air Motor develops tremendous speed and power from normal air pressure. At 100 lbs. air, power is great enough to punch $\frac{1}{2}$ " dia. hole through $\frac{1}{16}$ " thick mild steel. Ideal for staking, riveting, forming, swedging, stamping or punching.

The Super-Speed Air Motor is a complete power unit with built-in low voltage Electroaire directional valve and speed regulators. (Also available with manually controlled valve.) Only one air connection needed.

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$2\frac{1}{2}$ " BORE
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Stroke Lengths
 $2\frac{1}{2}$ " 4", 6", 9", 12"
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Seven Mounting Styles

1214

elements although small on the entire cycle; in other words, the actual time might be anywhere from 0.02 to 0.04 minutes. But movie frame counts of several elements in different cycles would not only yield an answer closer to the actual one in this instance but would enable the observer to break down this 0.03 element into five or ten elements. Such a fine breakdown is very important for short cycle work of less than 0.10 minutes, for it enables the

analyst not only to point out the "pay dirt" in fast hand or machine-paced jobs, but it enables him to build up standard data with carefully defined starting and stopping points.

3. The movie serves as an **historical record** of the exact method under which a standard is set. The chief cause of incentive creepage is the small month-to-month changes that take place in jobs. The conventional time study, especially in short cycle work, is lacking in detail

The New VIKING HYDRAULIC

SPEED-MILL

**CUTS PRODUCTION COSTS
on
SMALL-PART MILLING!**

- 2" Precision Spindle
- 4 Spindle Speeds to 975 RPM.
- 8-Gallon Coolant System
- Automatic Lubrication



Automatic Table-Cycling and Hydraulic Feed Control Rate of Output As Selected

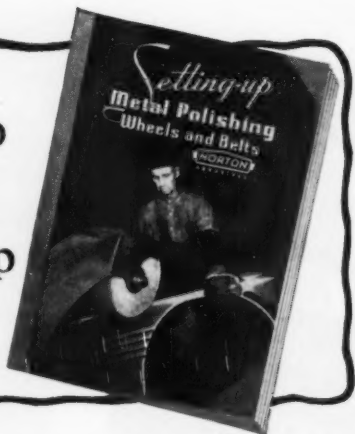
Speed-Mill answers the problem of how to increase light production milling output, where man-hours are scarce. Small, light pieces requiring multiple-cuts, good finish and precision limits are milled fast, accurately, economically and with a minimum of operator effort.

Speed-Mill gives you hydraulic feeds, automatic table cycle, oversize capacity and rigidity. The exclusive hydraulic system offers additional flexibility for custom tooling and infinite feeds. As a result of these features, many plants group-operate Speed-Mills with existing personnel, to step up production over single machines demanding full attention.

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This 48-page booklet, prepared by Norton abrasive engineers, shows you how to get the most out of your metal polishing set-up wheels. It covers the whole subject from abrasive grain selection and glue preparation to efficient use of the finished wheel. It also gives graphic proof that Norton ALUNDUM Abrasive lasts longer and polishes better . . . thanks to a uniformity that makes every grain work. Send for your free copy of Booklet No. 1340 today. NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities.

NORTON

ABRASIVES

Making better products to make other products better

and description of finger and hand motions to say nothing of distances and the names and descriptions of jigs and fixtures and other mechanical aids that are used. Would it be exaggerating to say that between 30 to 40 per cent of standards disputes arising out of methods changes could be eliminated if it were possible to see the original job?

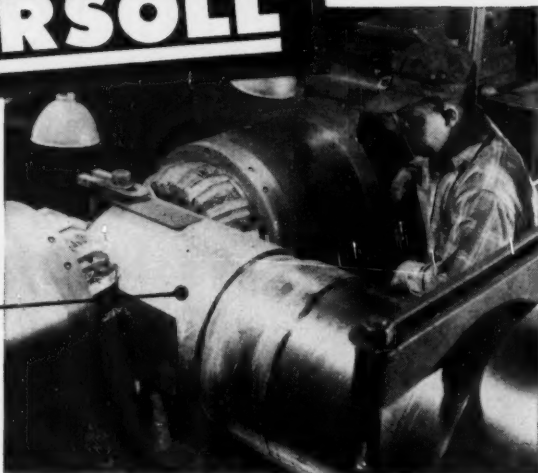
4. The movie could and should be used for **methods improvements**—for

making the job easier. This may be accomplished in several ways. The most successful way this was accomplished, somewhat inadvertently, was a few years ago. Movies had been taken of four jobs which had just been improved by a local management. It was desired to drive home to the foremen and operators on the jobs good job design. Rather than interrupt production of 15 people to see a 16 minute movie without any tangible results, the works manager and

INGERSOLL

SHEAR CLEARS

ON...
STEEL MILL ROLL
52 SCLEROSCOPE



● Milling drive flats on this steel mill roll is difficult because the material is hard, tough-cutting, close-grained cast iron. Four inches of stock is removed on each side by large-diameter Shear Clear face mills with carbide-tipped blades, taking cuts up to 1-1/2" deep at 6" feed rates.

● Radii on the roll necks vary considerably from roll to roll and are machined with small, inexpensive, easily changed form cutters mounted over the Shear Clears. This unusual arrangement results in a much higher rate of metal removal, reduces the investment in costly large-diameter radius cutters, and saves cutter-changing time.



Machine and cutters built by Ingersoll for United Engineering & Foundry Co.

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TUNGSTEN-CARBIDE TOOLS AND DIES

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10 times longer life

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DETAILS TO
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HYPREZ DIVISION

ENGIS EQUIPMENT CO.

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CHICAGO 5, ILL.

chief industrial engineer decided to try an experiment:

Call the group together and tell them: "We called you in to let you see the movies we took a few weeks ago. We are going to show you these movies twice today and once tomorrow. The price of admission to tomorrow's show is this 3x5 card on which you will put a question concerning any one of these jobs. You need not sign the cards when you hand them in tomorrow."

How many cards were turned in the following day? Thirteen! Instead of getting 15 intelligent questions about technical phases of the jobs, 20 questions and suggestions were advanced on how the improved jobs might be further improved. Twelve of these were accepted.

But the real payoff came when the manager who conducted both meetings completely reversed his negative position on employee and supervisory meet-

If you want to
**ELIMINATE
 GASKETS**
 ON PARTS LIKE THIS



INVESTIGATE
 LAPPING ON A

LAPMASTER



Expensive gaskets for this 9½" long, intricate cast aluminum body have been eliminated with a 48" Lapmaster by lapping the joint surface flat to an all-over light band pattern. Pressures up to 3500 psi can be sealed when mating faces (of sturdy pump parts) are lapped to this tolerance.

The Lapmaster 48" readily handles large and small parts of a wide variety of shapes and materials in production runs. *This machine does not require conditioning of the lap plate, it uniformly distributes "wet" lapping compound, and it operates with practically no maintenance.*

96 PARTS LAPPED PER HOUR

Production on the valve body part shown above is maintained at the rate of 8 parts per five minute cycle. The machine is equipped with 4 lap-conditioning rings each holding two parts.

Get the Facts on Better Lapping Production and Accuracy—
 Investigate the production and accuracy possibilities of Lapmasters. This 16 page book contains valuable information on this remarkable new lapping method. Write on your company letterhead today, Dept. B88 1012 Cuyler Ave., Chicago 13, Illinois.



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LAPMASTER DIVISION CHICAGO 13, ILL.

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JOHN CRANE

SAMSON HAND SHEARS

Bench Type

- All Steel Construction
- Unbreakable Frame
- Easy Operation

**IMMEDIATE
SHIPMENT**



Catalog of Metal Working Equipment furnished on request.

SIZE	No. 3R3	No. 3R4	No. 3R5	No. 3R6	No. 4R10
Cuts sheet or plate up to	14 ga.	1/8"	3/16"	1/4"	5/16"
PRICE	\$16.45	\$23.80	\$30.15	\$73.80	109.20

f.o.b. New York, prices subject to change

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Established 1910

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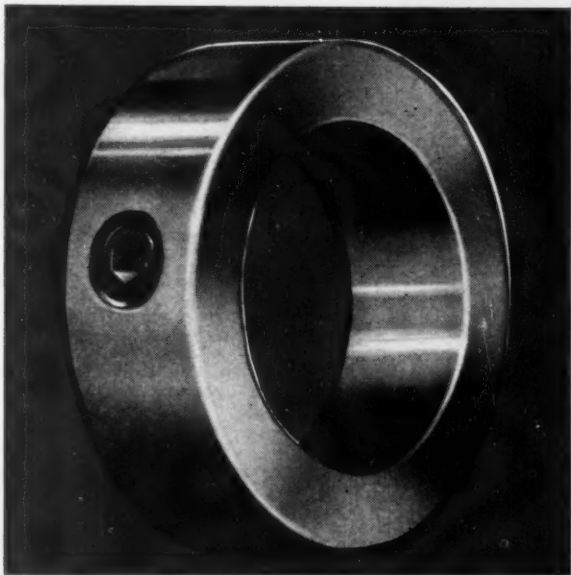
ings—reversed it to a point where he sat down after this second meeting and drew up plans for a \$5,000 air conditioned, movie equipped, accoustically treated conference room.

Disadvantages of movies in standards setting

1. Against the foregoing advantages is the main disadvantage of cost. A typical shop movie can cost anywhere from \$10 to \$1,000 depending on a number of

factors. Certainly one of these factors is the experience and fussiness of the photographer. The writer, by no means a professional photographer, takes from 30 to 50 minutes to get a 4 minute \$10 movie; this time includes the titling, and may include as many as 10 different operators all doing the same thing; it includes panoramas and close-ups; it includes shots taken from at least three different angles; some of the shots may be a little over-exposed or a little

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with **UNBRAKO** Self-Locking
HOLLOW SET SCREWS



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Precision machines from solid bar stock in 42 stock sizes for shafts from 3/16" to 3" diameters inclusive.

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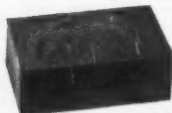
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TYPE HOLDERS AND STEEL TYPE

Parker precision press and hand marking type holders are engineered for quick, accurate interchangeability of type. This is furnished in all standard character sizes from 3/64" to 1/4" or in special type and symbols to your specifications.



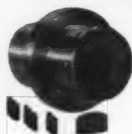
MARKING DIE FOR AZIMUTH SCALE

Sharp, clean, raised 1° increments and a double row of perfect figures, from 10 to 170 in this semi-circular azimuth scale all hardened into a solid tool steel block. Parker dies cost less because they perform perfectly—longer.



STANDARD OR SPECIAL STAMPS

Parker steel trade mark, identification, part number or inspection stamps are made in dozens of standard shapes and designs. Special stamps in any quantity, any size to mark any material are also manufactured to your specifications.



REMOVABLE INSERT MARKING DIES

This removable segment die is used for stamping and coding military shell cases. Here one die replaces three used previously and eliminates two stamping operations, thereby decreasing marking cost by over 60%. Another application of Parker experience and craftsmanship.

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BLUE BOOK TODAY**

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THE
PARKER
STAMP WORKS, INC.
MARKING DIE & MACHINERY DIV.
FRANKLIN AVENUE • HARTFORD, CONNECTICUT

under-exposed; some of the close-ups may be a little out of focus. But it should be remembered that such movies are for in-plant use—not for sales meetings or professional society conferences. They are black and white. By keeping the cost down, one concern employing 8,000 people has taken over 2,000 movies of jobs within the last four years and have used these movies not only in Work Factor analysing jobs, but in

selling their results to the people.

2. Time is another factor against movies. Movies cannot be used to advantage where the "heat is on" to turn out standards within an eight hour period for it takes from 5 to 10 days to mail and process most such movies; there are local 16mm processing firms that offer 12 hour service on 16mm negative and positive film. But most shops have learned by this time that

TIME-MONEY SAVING

Accuracy



AT YOUR FINGERTIPS

A must for your bench — Horberg Drill Size, Pin Gages. Unlimited time and cost saving advantages in center and location finding, hole or slot gaging.

- Held Accurate to $\pm .0001$ — .0000
- Concentric tapered to fit holes .0012 smaller than gage size.
- $1\frac{1}{2}$ " in length for easy insertion
- Highest quality oil hardened tool steel
- In convenient indexed stand for quick selection

Letter sets of 52 gages, A-Z in pairs

Fraction sets of 60 gages, $\frac{3}{64}$ " to $\frac{1}{2}$ " in steps of $\frac{1}{64}$ " in pairs

Number sets of 120 gages, 1 to 60 in pairs

Individual gages in stock

Extra stands available

All Items Stocked for Immediate Delivery

FROM

THE *Horberg* GAGE COMPANY

Quantity **21 STAPLES ST., BRIDGEPORT, CONN.**

..... Letter Sets @ \$45.

..... Fraction Sets @ \$50.

..... Number Sets @ \$90.

..... Single gages @ \$ 1.

..... Stand alone @ \$10.

Please Rush checked items and literature to

Company.....

Address.....

Name.....

Title.....

even eight hour time study service without the benefit of standard data or synthetic time values is apt to be treacherous.

3. **Photographic skill** is yet another deterrent. However, anyone around the shop who has taken ten rolls of home movies is generally sufficiently experienced to do the kind of job that can be useful. Frequently another local industrial engineer has tried the movie approach for either work simplification or work measurement; such a man is usually so enthusiastic about the technical and sales possibilities of the movie approach that he is quite happy to spend a morning or an afternoon in demonstrating its application on one or two jobs in a neighboring plant.

Union reaction to movies

Like most other scientific management techniques, most unions frown upon movies. Some union contracts even forbid the use of movies except

with the permission of the union officers.

Just as the Federal law prohibiting the use of stop-watch time studies in government contracts has been ineffective (written at the insistence of union pressure), so the prohibition of on-the-job movies would be difficult to justify. In the 2,000 movies taken by the company referred to above, not one grievance has been entered by the union (C.I.O.) to the taking of these. The writer has encountered no union resistance in the 300 industrial movies he has taken within the last ten years in 24 different plants which involved all the major unions and many in the "minor leagues."

This does not mean, of course, that management can step into a department at any time and start shooting movies. Common sense would dictate an explanation to the union steward and the operator(s) of the why and when of

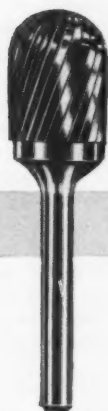
HOW ABOUT CUTTING A FEW GEARS

by Professor Herman Reichardt, Consulting Engineer

Ten points for each question answered correctly. 80-100 is excellent; 60-70 is fair; 50 or below . . . you're probably one of those lucky fellows who make so much money that you don't have to know any answers.

1. The number of teeth in a gear cutter is the number of teeth per inch, a multiple of the teeth in the work, or the total number of teeth? _____
2. The finishing row of teeth remains sharp longer because of their being harder material, are shorter or they remove less material? _____
3. Series-gap, involute or shank type cutters are generally used for cutting internal gears? _____
4. When cutting helical splines a deeper, wider or exact width recess must be allowed for the cutter? _____
5. The width of the recess is governed by the shape, depth or width of the spline and the helix angle? _____
6. The desired fit of mating spline parts are obtained by speeding up cutter or amount of pressure? _____
7. Cutters employed in cutting cams are involute, interrupted teeth or shank type cutters? _____
8. Cutting two rows of teeth of different shape on a gear shaper requires two cutters or a single cutter? _____
9. When slots must be cut below the rim of the gear, shank, prong, or involute type cutters are used? _____
10. Irregular shapes are generated by two or a single cutter? _____

Answers to quiz on page 299



They're **TUNGSTEN CARBIDE**



They're **PRECISION GROUND-FROM-THE-SOLID**

Write
for our
complete
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QUALITY ENGINEERED

END MILLS
ROTARY FILES
BORING BITS
REAMERS
BURS and others
by **ATRA**X

THE

ATRAX

COMPANY

NEWINGTON IN CONNECTICUT

the movies. The writer even checks this preparation which the foreman is supposed to make by asking each operator whose picture he is about to take whether he objects to having his picture taken.

Occasionally, an operator does object: "It makes me nervous" or "I'd like to powder my nose first." Instead of trying to persuade an operator against his will, the writer will thank him and pass on to the next operator. Usually the problem is not so much to interest operators in having their pictures taken but in not hurting anyone's feelings by being left out. For this reason, the writer's main discussion is with management who is generally interested in filming the best or most experienced operators instead of all of them including the beginners.

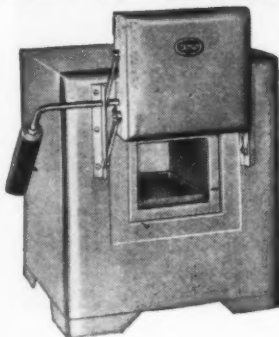
Unfortunately, management has taken a very short-term view of these industrial movies. They look upon them as

either work-simplification or a work measurement tool (seldom as both). From the writer's experience, fewer than 50 per cent of the shop movies are ever shown to the operators—despite repeated inquiries from operators about the movies. What a beautiful industrial relations opportunity management is passing up when it overlooks this by-product of the spot movie technique. Indeed, it is not too difficult to imagine that operators might be of assistance to management in the working out of better methods and better standards in the quiet atmosphere of the conference room.

Suitable time study camera and projection equipment

For anyone interested in the camera approach to work measurement, the writer recommends that he borrow or rent equipment for the first half dozen jobs so that he can better appraise the

STEP UP PRODUCTION . . . CUT COSTS with



HEAT-TREAT FURNACES

Eight convenient sizes of electric bench-type units to solve your heat-treat problems. Available with either electronic or manual temperature controls.

Priced from \$55 to \$500

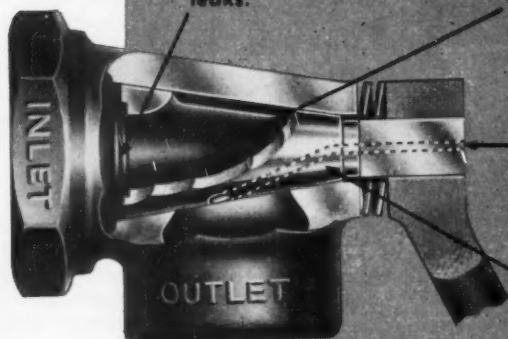
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- **ECONOMICAL TO OPERATE**
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PRESSURE-SEATING

Line pressure forces control plug into seat—preventing costly air line leaks.

FULL-OPENING

No throttling of air—every tool gets full air pressure for maximum efficiency.

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A half turn of the handle closes the valve and bleeds downstream line—making it easier and safer to uncouple tools.

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Non-galling materials provide a self-honing action that prevents leaks and increases valve life.

SIMPLE CONSTRUCTION

No disks or packings to fail and start leaks. Basic design assures positive seal and long life.

**5 reasons why
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should have**

CLECO

PRESSURE SEATED
AIR VALVES

Cleco Air Valves pay for themselves over and over again in the air they save. Furthermore, by delivering full air pressure to the tools, they increase production.

Cleco Air Valves are made in four styles and in all sizes from 1/4" to 1". Write for full information, including the name of your nearest dealer.



CLECO DIVISION

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5125 CLINTON DRIVE

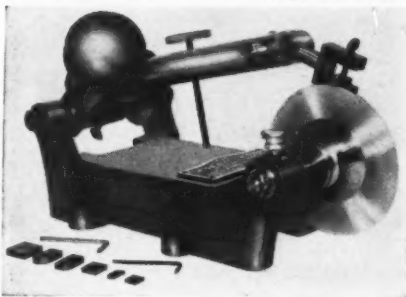
HOUSTON 20, TEXAS



Carbide Users

CAN NOW RESTORE BROKEN TOOLS AND CUTTERS QUICKLY AND INEXPENSIVELY WITH THE NEW IMPROVED MODEL NO. 300.

UNION CUT-OFF MACHINE



WHAT IT DOES:

Cuts broken sections off damaged carbide tools without grinding.

Cuts standard carbide blanks to any desired size.

Saves time-consuming grinding on carbide tools.

Saves carbide tools that otherwise would be scrapped.

Saves you money on costly diamond grinding wheels.

Saves you money by making possible the purchase of large-size standard carbide blanks. Simple to operate and automatic in operation.

SPECIFICATIONS:

1/4 H.P. motor, 1725 R.P.M. 110 Volt. Overall size 7" x 12" x 8" high. Supplied complete with diamond cut-off blade and motor for \$275.00 F.O.B. Stamford, Connecticut

LITERATURE ON REQUEST

UNION
WIRE DIE CORP.
71 W. 45TH ST., NEW YORK 19, N. Y.
PLANT: STAMFORD, CONNECTICUT

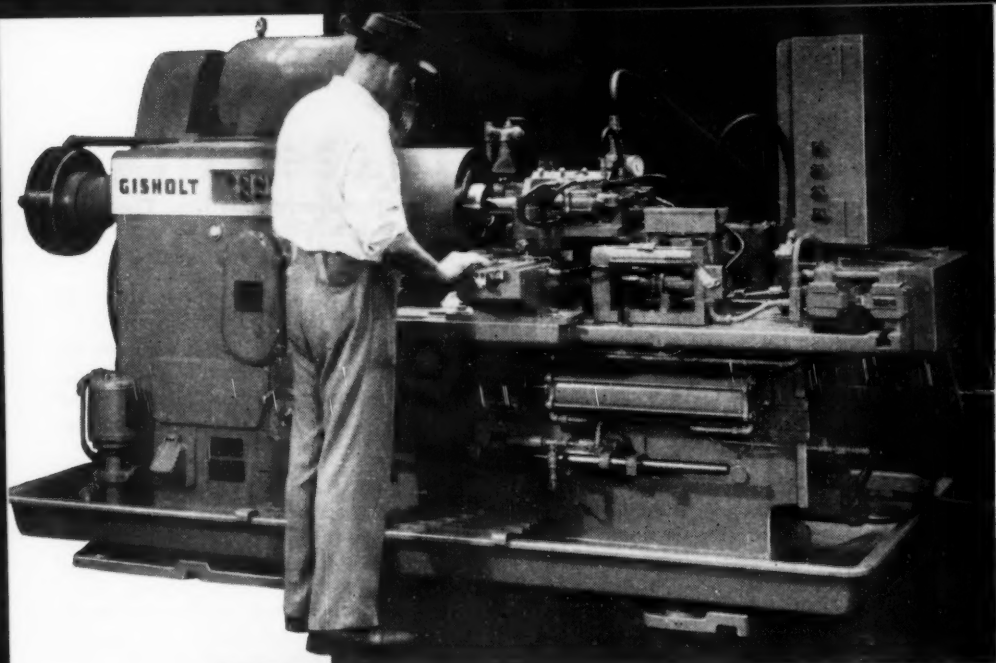
cost, time, and results variables as applied to his own operation. Don't do, as a few have done, authorize a \$1,000 budget for camera and projection equipment only to find out that it did not do the job you expected of it or that other equipment discovered later was far more suitable. The following analyses of various types of equipment might be of help to home movie fans who are thinking in terms of industrial engineering camera and projection equipment.

Cameras

Cameras may be classified in various ways. Three or four of the leading brands costing from \$200 to \$500 might have one or more of the following:

1. **Spring drive versus electric motor drive.** Spring cameras are 20% to 40% cheaper, of course. They possess the added advantage that they do not rely on a power source (and extension cords) for their operation. Their film capacity is usually greater (100 feet compared with 50 feet of magazine film for the electric camera). But the spring driven camera speed may not be as constant (16 frames per second) as the synchronous motor drive of the electric camera. Moreover, the spring driven camera must be rewound every half to three-quarters of a minute (and frequently needs re-winding right in the middle of a cycle or critical part of the job). Hint: Remember to wind camera at the beginning of every cycle or sequence.

2. **Spool vs. Magazine Load.** The spool usually takes 100 feet of film compared with the 50 feet of the magazine camera. The film for the spool camera is about 20 percent less costly. Against these obvious advantages, the magazine load camera can be re-loaded when it is desired to go from black and white to color, or in making any other film change, or 25 feet of film may be removed for processing instead of taking a lot of useless shots just to finish out



HOW **8** SIMPLIMATICS

cut machine time 50%
cut man hours 75%

The way you can slash costs with the Gisholt Simplimatic often surprises some of the most experienced production men.

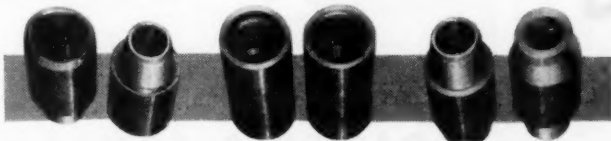
Here's a big shop which found that 8 Simplimatics could take over the job done on 16 other machines. And it takes only 4 operators instead of 16 to turn out the volume of parts required.

Not the least in the cost picture is the machine itself. For the basic Simplimatic

design permits you to individualize the machine to a high degree to solve many different problems. Thus, for many jobs you can have all the advantages of a special machine merely with special tooling. Yet it's all done on a Standard Simplimatic—at far lower cost.

The importance of lower costs these days makes it important for you to get all the facts about Simplimatic Automatic Lathes.

The GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface finishing and balancing of round and partly round parts. Your problems are welcomed here.



In producing these tool joint pins and boxes, the 8 Simplimatics work in pairs with fully automatic operation—one man can easily tend two machines.

Ask about the many different arrangements possible on the Standard Simplimatics with platen table, vertical head, etc.

GISHOLT MACHINE COMPANY, Madison 10, Wisconsin

TURRET LATHES • AUTOMATIC LATHES • BALANCERS • SUPERFINISHERS • SPECIAL MACHINES

a roll of film. There is less chance of light damaging a film with a magazine load than with conventional film.

3. Black and White Vs. Color. The question of color has to do with the film—not the camera. To be sure, most good cameras today have “coated” (color) lenses; but such coloring is designed to increase the amount of light entering the camera.

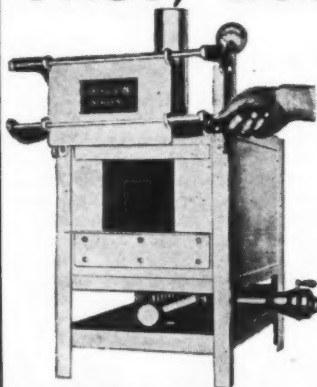
The question of whether to use black and white or color film always comes up. The color film is about one-third more expensive than comparable “speed” black and white reversible film. But it has the advantage that additional prints (black and white, however) may be made from it compared to the one-print possibility of

conventional reversible film. The lighting is not nearly as critical with black and white as it is with color.

The writer prefers Reversible XX black and white film for his work for he finds he gets by 90 per cent of the time without any auxiliary lighting. In other words, XX film and a 1.9 or 1.5 lens opening is enough for most industrial applications.

4. What Camera Accessories? It is easy to be mesmerized into buying everything listed in a movie camera catalog. To the beginner, every gadget seems necessary (I have titlers, flood reflectors, and other gimmicks which I once thought necessary but which I would be willing to sell at half their original cost).

FAST, ECONOMICAL HEAT!



\$160.00 Complete

Model No. 2 Bench Type
Maximum Temperature 2000° F.
Heating Chamber 7" Wide,
12" Long, 5½" High.

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**NO NOISY BLOWERS, NO PARTS TO WEAR OUT
1500° F IN 15 MINUTES AND 1900° F IN ONE HOUR
ONE CONNECTION ONLY
ALL MODELS COMPLETE WITH ACCURATE
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DESCRIPTIVE BOOKLET LISTING ALL MODELS
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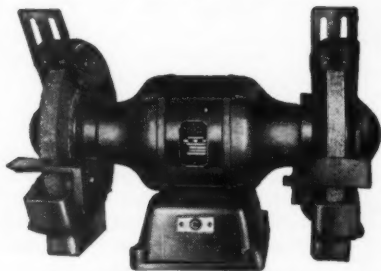
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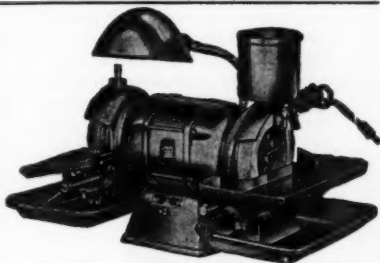
Baldor

PRECISION GRINDERS



Grinder No. 1010 shown here is a rugged 130 lb. general service grinder with 36 & 60 grit wheels. 3 phase, 1725 RPM motor will take plenty of overload and abuse — guaranteed not to burn out. Wide clearance between wheels and motor frame allows working on large or odd-shaped pieces. **\$117.00**

The Special Reversible Carbide Tool Grinder shown at the right is a heavy-duty, ½ h.p. 3400 RPM grinder for sharpening carbide tools and high speed steel tools. This motor is the trouble-free capacitor-start, capacitor-run type. **\$142.60**



OUTSTANDING FEATURES:

The near perfect balance of armatures and wheels on Baldor Grinders provides smooth, vibrationless performance, permitting precision grinding to closest tolerances.

Motors have ample power for normal use plus reserve power to withstand temporary overloads and are built to give years of heavy-duty service.

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Reports from users and recorded results of accurate tests—with all test conditions equal—prove that the MILFORD All-Hard REZISTOR power hack saw blade outperforms all others! It is setting new standards for speed, accuracy and endurance every day! The M-2 high speed steel, positive heat treatment and rigid quality control used in manufacturing this fine precision tool truly make MILFORD "THE STANDARD OF QUALITY . . . THE WORLD OVER."



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Saw Specialists Exclusively

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Rather than tell the reader what he should have in the way of camera equipment, it might be easier to tell him what I have:

a. **Camera:** A conventional roll feed camera with a 1.5 lens (no turret or other special devices). This enables me to take clear pictures up to 15 inches away from the object with the lens that came with the camera. Instead of a tape, I have a range finder mounted on the side of the camera which enables me to estimate distances quickly (for distances under three feet I use a tape). This camera was bought 10 years ago for \$175 at one of the mail order houses and may be purchased today for \$300.

b. **Tripod:** Although I have a tripod, I seldom use it because of its weight and bulkiness. By carefully holding the camera against the forehead while shooting, steady pictures are possible.

c. **Light Meter:** Although I spent several years studying lighting, I seldom trust to my judgment in estimating lighting intensities. I use one of the standard makes of light meters and measure intensities just before shooting despite the wide latitude afforded in XX Reversible film.

d. **Flood Lights:** Although I always have with me at least one small R-2 flood reflector light, I seldom use it because of the time and trouble involved and because I don't like to convert a factory department into a movie studio even for 40 minutes.

Thus in one zipper travelling case, I carry enough camera equipment to do 95 per cent of all industrial movie jobs I have come across—at considerably less than \$500 at current prices.

Projection equipment

There are over a dozen makes and kinds of 16 mm silent and sound projectors. There are, however, two commercially available projectors that can touch a work measurement problem: (1) DeVry (Chicago) and (2) Bell & Howell (Chicago).

1. **DeVry:** This projector is a little 200 watt hand crank job (electric motor optional). It sells for around \$75 and is an ideal instrument for someone getting started in a camera—work measurement program. Unfortunately, this hand-cranked model has been discontinued by DeVry because of defense contracts. However, borrowing arrangements may be made with some local university having a large industrial engineering department; such departments have passed out these projectors freely to advanced industrial engineering students

2. **Bell & Howell:** By far the finest projector available today is the Bell & Howell Motion and Time Study projector selling for around \$500. Unlike the DeVry machine above, the Bell & Howell has no colored screen which darkens the picture when it is stopped. It has a frame counter (Veeder-Root) mounted right on the machine which is a decided convenience when cycle times go beyond 0.05 minutes and frames must be hand cranked and counted. It has a reversible or back-up mechanism in addition to a motor driven re-wind.

The Bell & Howell projector also has a variable speed rheostat which is calibrated; this varies the speed of projection from 800 to 1200 frames per minute. This calibrated speed regulating device suits the machine well to group time study levelling or rating. However, because an increasing number of shop movies are being shot at 24 frames per second (anticipating future sound "dubbing"), it would seem the upper speed of this projector should have been set at no less than 1500 frames per minute, thus enabling one to project a film (with a double set of holes) at normal speed regardless of whether it was shot at 16 or 24 frames per second.

For light Staking, Riveting, Forming, Broaching, Punching, Assembly, etc. . .

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including in one tool: (1) air-powered squeeze, plus (2) air-reset impact, with **LOWEST FATIGUE, FAST and PRECISE POWER, and GREATEST SAFETY** as compared with old-fashioned "kick" presses.

Speed—up to 75 blows per minute.

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airline pressure, under precise control.

Safety—assured by two-hand release or accessory Slide Feed.

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Conclusions

Just as television has intensified radio listening interest, so the low cost shop movie has limitless possibilities: (a) in setting production standards, (b) in selling production standards, (c) in making jobs easier through work simplification techniques and conferences, (d) in preserving historical records of how jobs were once performed, and (e) in minimizing the time and expense of trips to distant plants by foremen and engineers.

A program of industrial engineering on-the-job movies may and should start out in a small way with either a local home movie fan using his skill and equipment to demonstrate these in-plant possibilities (and limitations) in your own operations or some professional engineer who has had considerable experience with the technique (and who probably can furnish his own equipment).

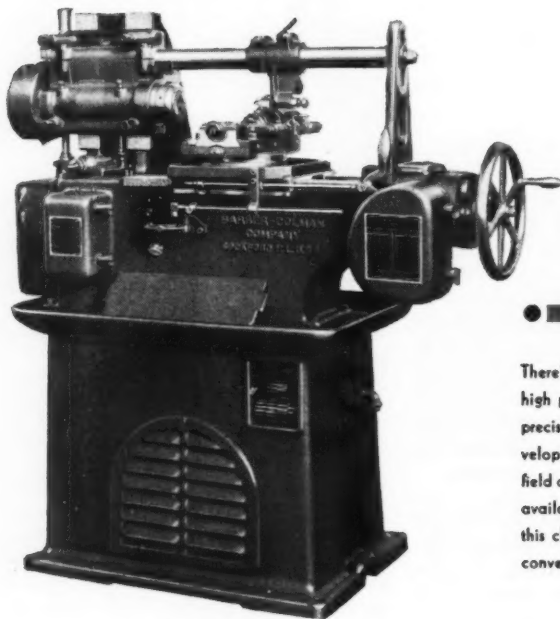
The End

WHEN YOU WANT

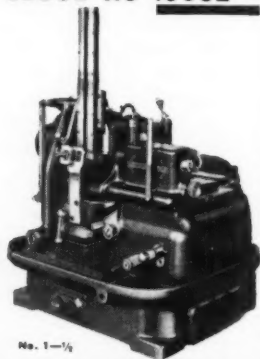
ON SMALL FINE PITCH GEARS TO 268 D.P.

WITH TOOTH SPACING LIMITS AS CLOSE AS .0002"—

production ...



No. 6-10



No. 1-1/2

There's no need to sacrifice accuracy to get high production on instrument, clock, meter or precision mechanism gears. Continuous development by Barber-Colman engineers in the field of precision small fine pitch gears has made available the same production capacities for this class of work that is common in the more conventional pitches and sizes.

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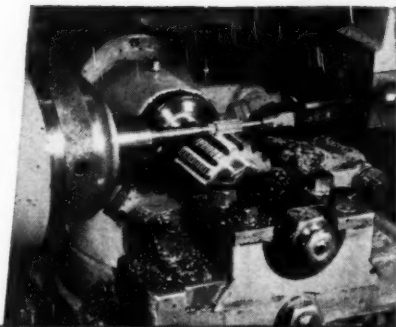
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HOBGING MACHINES

These are Typical Jobs!



Shown in Relative Size To A Paper Clip

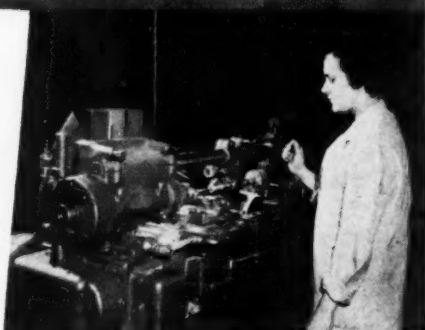


Detecto Scales, Incorporated, Finish-Hobs 7-Tooth Pinion Δ Every 5 Seconds

This Barber-Colman finish-hobbing operation produces pinion teeth within .0002" adjacent tooth spacing limits, holding .0015" concentricity. Hobbing cost per pinion is negligible, with hobbing time of 5 seconds and hob life of 18,000 pinions per sharpening. One operator services a battery of six machines, loading and unloading with quick-acting center bracket. Here are the specifications: 7-Tooth pinion, .346" O.D., 3/4" face B1113 Steel. Hob — Barber-Colman, Ground, Topping, Multithread, 18,000 pinions per sharpening. Feed per rev. of work—.050", Hob Speed—533 rpm.

Instrument Manufacturer Hobs 3600 Gears per Hour \triangleright 120 D.P., .0003" P.D. Runout, .0002" adjacent Tooth Spacing

Typical of a range of fine pitch gear work in the plant of a large precision instrument maker, this hobbing job requires a high degree of finish and accuracy on a high volume basis. A battery of three machines produces 3600 gears per hour. Close tolerances are consistently maintained at this rate of production. Fast loading and unloading is accomplished with air-operated tooling equipment. Here are the specifications: 50-Tooth Spur Gears, 120 D.P., .433" O.D., .031" face, Brass. Hob — 1-1/8 x 1 x 1/2", Ground, Multithread. Feed per revolution of work—.150", Hob Speed—183 rpm.



When you require small gears, in pitches as fine as 268 D.P. (200 D.P., Ground Hobs; 150 D.P., Carbide Tipped Hobs) in high volume and with close limits of tooth accuracy and concentricity, call your Barber-Colman representative for assistance. With the precision and engineering built into the hobs and machines, he can help you reduce such problems to ordinary gear cutting procedure.

Barber-Colman Company

GENERAL OFFICES AND PLANT, 519 BEEK STREET, ROCKFORD, ILLINOIS, U.S.A.

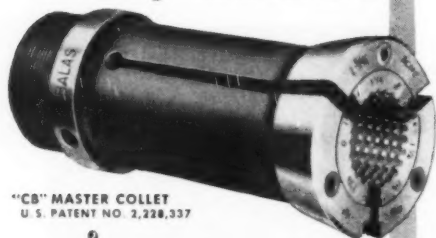
Send for a copy of Facts About Fine Pitch Hobs.

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every machine

more production

lower costs



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Balas Master Collets for all
multi-spindle automatics from
 $\frac{1}{8}$ " capacity and over.

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Balas Master Collets reduce set-up time because they are front loading... the pads are easily changed without disturbing the setting of the collet. They run truer, grip tighter and work faster, increase your production and lower your costs regardless of the make of machine or type of material you use. In addition, Balas Master Collets handle stock to full capacity of the machine, thereby reducing collet inventory.



MODEL "A"
MASTER PUSHER

Balas Master Pushers for all
sizes of automatics furnished
with steel, cast-iron, bronze
or hardened Meehanite pads
depending on the require-
ments of the job.

BALAS PUSHERS

Balas Master Pushers eliminate lost production time by permitting rapid change-over from one stock size to another by merely changing pads. The unique design and construction of these pushers guarantee long trouble-free operation. Balas Master Pushers solve your difficult feeding jobs and speed up your production. They have proved to be outstanding "time-and-money-savers" on all types of machines in thousands of large and small plants throughout the nation.



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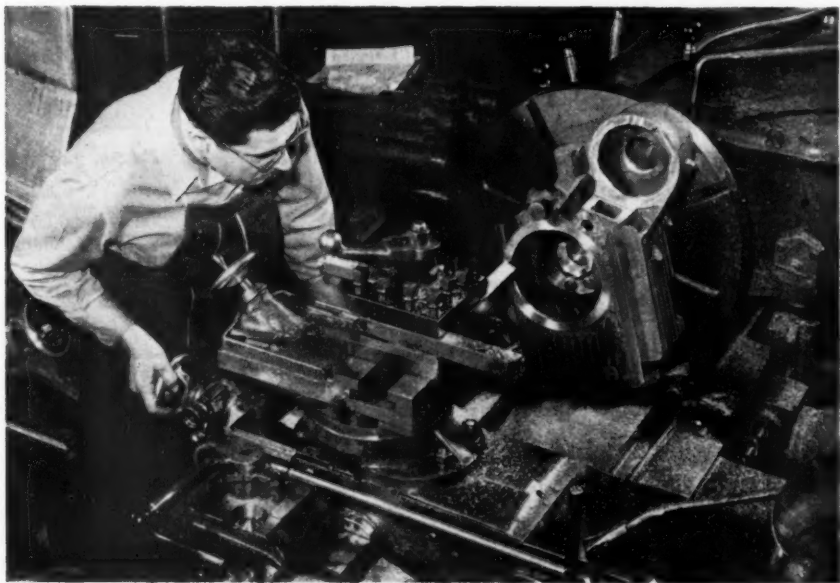
CLEVELAND 14, OHIO

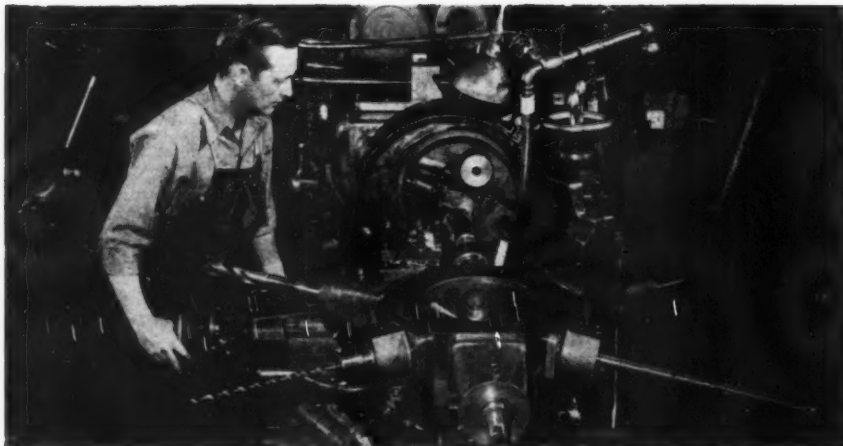
WORLD'S LARGEST MANUFACTURER OF COLLETS EXCLUSIVELY

Production shots at Axelson Manufacturing Company, Los Angeles

by Fred M. Burt

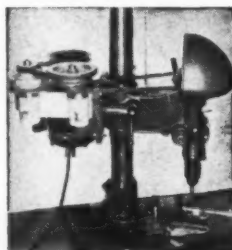
1. a relatively simple job . . . on an Axelson 20" engine lathe, facing, boring and chamfering magnesium alloy. Part is the housing for the planetary drive of a cabin super-charger in a Douglas plane. The housing is attached to a turning fixture which is a simple, round steel plate with three bolt holes. This attaches the housing in the two positions necessary for the seven operations. In the position shown the larger diameter is bored, faced and chamfered; the inner diameter has the same operations. The other large diameter is finish bored and faced, with the inner diameter finish bored, after re-positioning. With tolerances of a thousandth, eight of these jobs are completed in the nine hour day.





2. On this Warner & Swasey 2-A turret lathe . . . a 4140 rough forging for a North American nose gear fork receives a precision bore and O.D. in 13 operations which illustrates the ease and speed of performing these multiple operations. The 40 lb. forging is:

1. rough-faced on the end, enabling it,
2. to be centered, and then given,
3. a rough O.D. turning.
4. It is then drilled to 11" (plus) depth with a $\frac{1}{2}$ " drill, followed by enlarging the hole with,
- 5, 6, 7, 8. four successive drills, plus,
9. a flat bottom drill; then,
10. boring about 4" to true the hole to .002".
11. It is then reamed with a milling cutter to the bottom of the 11 $\frac{1}{4}$ " hole, then,
12. .040" more is taken off with an end mill, and finally,
13. the piece is finished by turning the O.D. to a .002" tolerance, and blending in the radius of each end. The bore ends up with a 100 finish (or brought to that standard by honing), and 250 finish on the outside.



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SPEED REDUCER

FOR DRILL PRESSES

- Allows drill head to move freely up and down.
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- Reduces spindle speed from 1725 RPM to as low as 100 RPM.

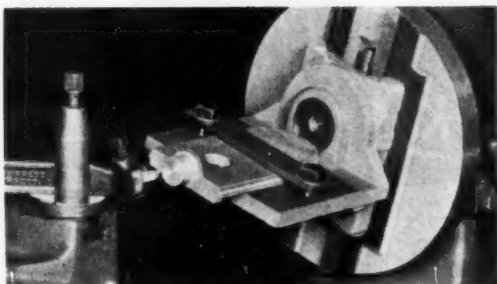
Easy to install, the Newman Speed Reducer is a multiple-speed attachment which is valuable wherever drilling, tapping, and reaming are done.

LOUIS NEWMAN MACHINERY COMPANY

8-10 STEARNS SQ.

SPRINGFIELD, MASS.

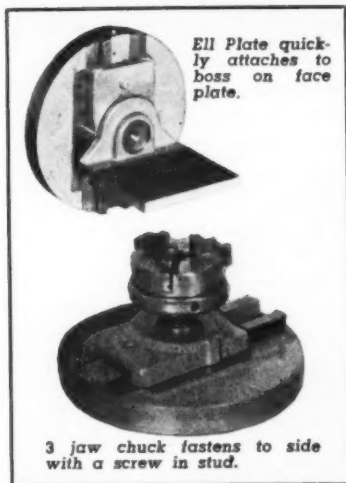
This **MICRO LATHE PLATE**



**Adjustable Slide on Face Plate
Centers Work Quickly**

***Saves* TIME and WORK**

Converts your lathe into a boring mill in 60 seconds!
Enables lathes to do offset turning, or bore three holes
not in line, without removing work piece.



*Ell Plate quickly
attaches to
boss on face
plate.*

*3 jaw chuck fastens to side
with a screw in stud.*

Ell Plate, 3 jaw chuck and MICRO FACE PLATE equip your lathe to do work that formerly required three or more machines.

MICRO LATHE PLATE, INC.
CLEVELAND 13, OHIO

This MICRO FACE PLATE has boss on an adjustable slide. Ell Plate or any special fixture locks to boss quickly. By moving slide across face plate and rotating fixture on boss, any point of work is brought in exact spindle center.

Boss saves bolting Ell plate to face plate. Work can be clamped to fixture in approximate position without taking time to locate it accurately.

In 60 seconds your lathe is ready to accurately machine odd shapes and do offset work.

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Please send circular describing Face Plate, Ell Plate and Three Jaw Chuck.

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See for yourself
... at no cost
... how superior it is!

*Stops wear, scorching,
burning, breakdown*

• Do you use white lead or ordinary grease to lubricate lathe dead centers? If so, do this . . . write for a trial tube of Dixon Lathe Center Graphite Lubricant.

We'll send you a handy tube of Dixon Lube **ABSOLUTELY FREE**. Once you try it, we are certain you'll swear by it forever!

Remember, this is no ordinary lubricant. It's special throughout . . . combines Dixon *Natural Graphite* and special lubricating compounds to provide *great film strength*. That's why it withstands terrific pressure and friction!

ALL YOU NEED DO is write to us (letter or post card), requesting free sample. Just give your name and position, and your company's name and address. Joseph Dixon Crucible Company, Jersey City 3, N. J.

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3. A steel forging (4340) . . . a right hand fork assembly for an airplane strut is being machined on an Axelson engine lathe, 32" Gap, heavy duty gap bed lathe, 32" x 100". (100" swing over carriage ways with gap open.) The work is placed with a ½ ton Budgit hoist on a jib crane. Machining this unit uses a 70" swing and 17½" gap.

1. Face flange.
2. Cut off false center to shaft O.D.
3. Cut thread groove.
4. Thread the shaft.
5. Grind to shaft bearing size using Dumore grinder with soft wheel .007" tolerance. (Because of the slow grinding requirements, time allowance for the complete job is extended to three hours.)

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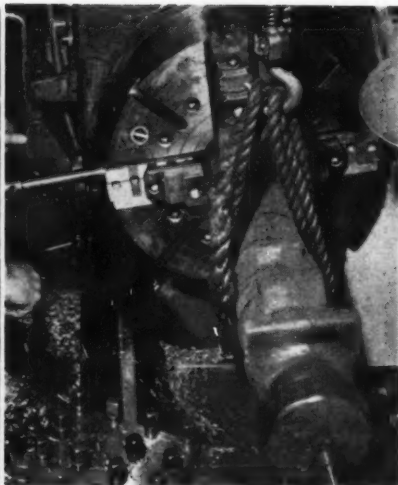
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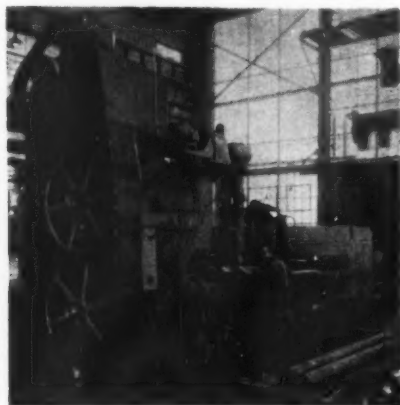
MINNEAPOLIS 7, MINNESOTA



4 and 5. A Warner & Swasey 4A turret lathe . . . was the first set-up made to turn 6 O.D.'s (two to plus or minus .002", the rest rough to about .010") on a 4340 forging weighing about 300 lbs. The shock strut barrel multiple O.D. operation had previously required three set-ups on a 24" engine lathe. Doing the job on this turret lathe cut about an hour off a (previously) three hour job, eliminated a rough milling operation and considerable handling and inspection time.

Suspended from a Budgit hoist on a jib crane, the forging was placed in a four-jaw chuck, centered and then supported on the other end with a center while the O.D.'s were cut. On each of two cuts about one inch of stock was removed, with $\frac{1}{4}$ " minimum on the others.

The End



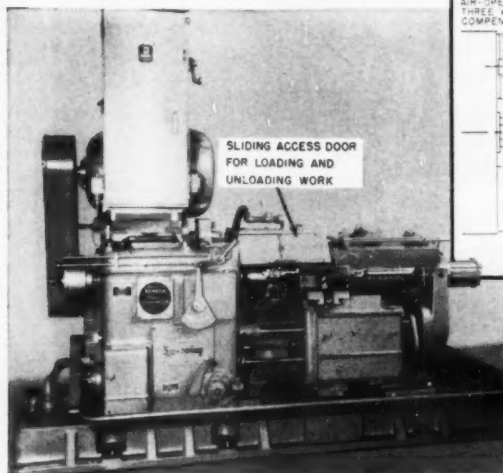
This Kling No. 100 rotary shear . . . with 17' clamp circle cutter is the largest assembly of its kind ever made. Its total weight is approximately 55,000 lbs. The machine is capable of shearing plate up to 1" thick, and the clamping attachment permits the cutting and flanging of circles up to 17 feet in diameter.

The unit was sold to Usines Schneider Creusot in Chalon-sur-Saône, France, through Simmons Machine Tool Corp. It is to be used in the fabrication of items employing heavy plate. Usines Schneider Creusot is the largest munitions manufacturer in France.

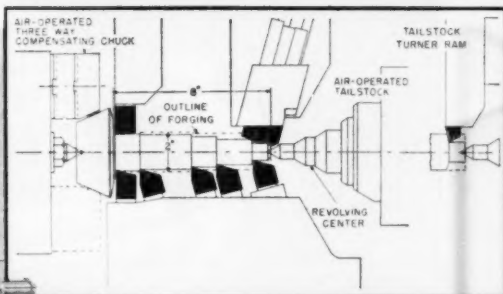
Machine was built by Kling Bros. Eng. Works, Chicago, Ill.

MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK



SLIDING ACCESS DOOR
FOR LOADING AND
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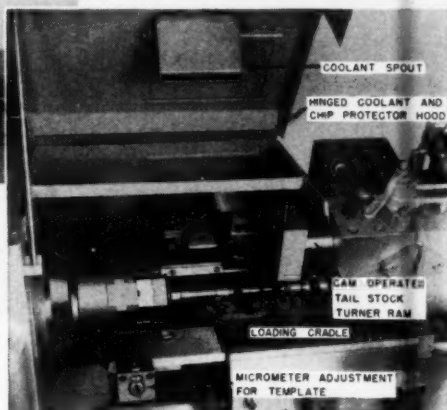


MODEL "AR" AUTOMATIC Lo-swing LATHE TURNS REAR AXLE PINION AT FAST PACE

Problem: Turn and face all stem diameters of Axle Pinion simultaneously, taking two cuts over the threaded diameter to remove large amount of surplus material.

Solution: The Model AR Lo-swing Lathe selected for this job was equipped with a cam-operated auxiliary turning ram mounted on the tail-stock casting and fitted with a carbide tool for removing surplus material ahead of a front carriage turning tool which does the sizing. The broken line on the drawing shows the actual shape of the forging and the large amount of surplus material at the threaded end. This drawing also shows the disposition of the tooling for turning and facing all diameters. All tools are tungsten carbide cutting at high surface speeds.

The machines supplied for this job were equipped with heavy chip guards to protect the operator from flying chips and coolant. Upper illustration shows the front sliding door thru which work is loaded and unloaded. Lower illustration shows the entire hinged hood in an



upright position to facilitate tool changes and adjustments. Note that the coolant spout is attached to and moves with the hood. This view also shows the cam operated tailstock turner ram and the loading cradle for the parts.

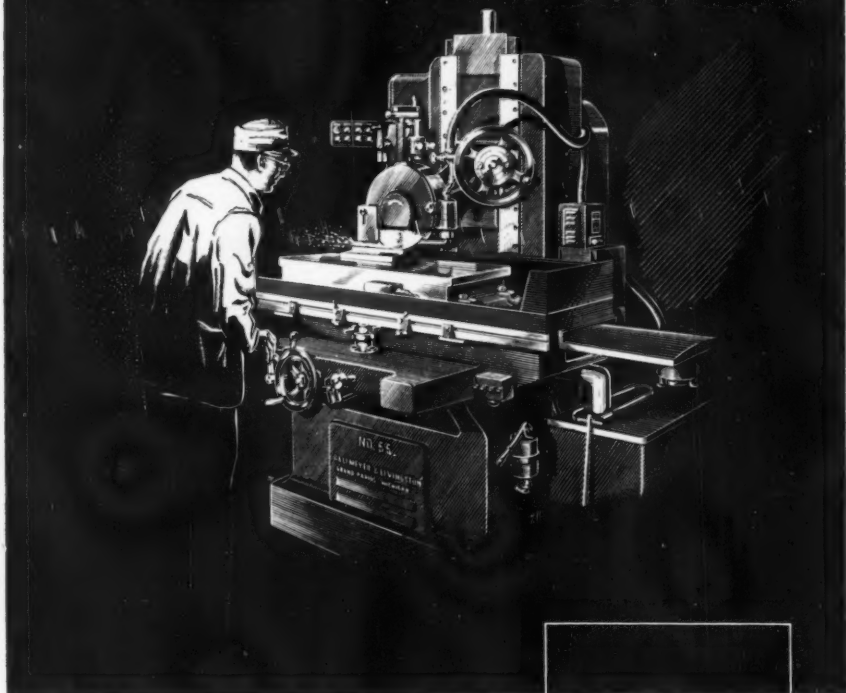
In operation, the operator simply opens the sliding door, places a rough forging in the loading cradle and closes the door. The air operated tailstock center pushes the part into position on the headstock center, the chuck jaws clamp the piece and the machine is then started. A safety device prevents starting of the machine spindle before the chuck jaws are closed, thereby preventing damage to the cutting tools and other equipment.

Seneca Falls engineering staff is at your disposal to help solve your turning problems.

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**A special report
by the editors of
MACHINE and TOOL
BLUE BOOK**

Report number 15

Lathes... part 3

This is the fourteenth in a monthly series of special reports discussing various types of machine tools. Included in this month's special report on lathes:

1. Automatic tracer control takes guesswork out of machining.
2. Descriptions of late model lathes.
3. Specifications of American-built machines.

Previously published reports discussed: 1. Thread Rolling; 2. Power Press Brakes; 3, 4, 5. Milling machines; 6. Honing, Lapping, and Superfinishing; 7. Automatic Screw machines; 8. MAPI Replacement Formula; 9, 10. Chucking machines, Turret Lathes, Hand Screw machines; 11. Broaching machines; 12. Shapers, Slotters, Keyseaters; 13. Lathes.

Understand basic metal cutting processes if you want to evaluate cutting fluids

by **M. Eugene Merchant**
Senior Research Physicist
The Cincinnati Milling Machine Co.

HEAT IS the most dangerous enemy of cutting tools in machining operations, causing them to fail prematurely and adding a burden of cost on machining operations. Thus the reduction of heat on all machining operations results in longer tool life and better performance and is an important factor in reducing machining costs.

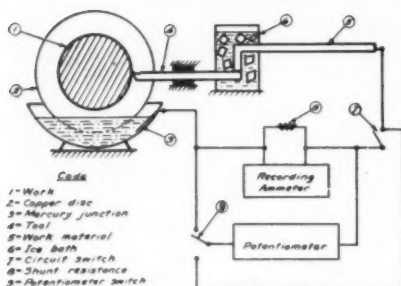
Tool life is largely controlled by

tool temperatures. A cutting fluid controls tool temperature in two ways:

1. by carrying away the heat that is generated in cutting,
2. by reducing the amount of heat generated in cutting by reducing the friction between chip and tool.

Thus, both of these factors are very important in influencing tool life. In the study which follows we shall analyze a chemical emulsion type cutting fluid which uses water rather than mineral oil as a carrier for its chemically active ingredients. Thus, since water

Schematic Circuit Diagram



1. Using the tool-work thermocouple method . . . of measuring temperature. The cutting tool is one element of a thermocouple and the work material is the other.

is about twice as effective as oil in carrying away heat, this chemical emulsion type cutting fluid may be expected to be about twice as effective as cutting oil in its ability to cool.

In regard to item 2, the ability to reduce chip friction, this depends on the chemically active additives present in cutting fluids. In the case of a compounded cutting oil, the inert medium in which these additives are carried is mineral oil. In the case of the chemical emulsion type cutting fluid, the inert medium in which they are carried is water. However, in both cases, chemically active additives are employed, and so both compounded cutting oils and chemical emulsion cutting fluids should be expected to give some degree of friction reduction in metal cutting.

Tool temperature and tool life in turning with cutting fluids

In order to illustrate the importance of the control of tool temperature provided by a cutting fluid, let us summarize the results obtained in an investigation of tool temperature and tool life in a turning operation when using

a cutting fluid as well as when cutting dry. The cutting fluid used was the chemical emulsion type, both in the form of the emulsion concentrate and a 40:1 ratio of water to emulsion concentrate. The work material was SAE 3115 nickelchrome steel, as rolled, in the form of 7 $\frac{3}{4}$ " dia. bars 40" long. The turning tool was 18-4-1 high speed steel in the form of a $\frac{1}{2}$ " square bit.

Tool angles were as follows:

end relief	5°
side relief	5°
side cutting edge angle	15°
end cutting edge angle	5°
back rake	2 $\frac{1}{2}$ °
side rake	9 $\frac{1}{2}$ °
true rake	10°
inclination of cutting edge	0°
nose radius	3/64"
tool holder angle	90°
setting angle	0°
chip breaker	none

The depth of cut was 0.100" and the feed was 0.0127" per revolution.

Method of measuring

Temperature measurements were made by use of the tool-work thermocouple method. In this method the cutting tool is one element of a thermocouple and the work material is the other, so that the temperature recorded is that at the chip-tool interface. The arrangement used is shown schematically in figure 1. This represents diagrammatically the set up for the turning operation and the associated equipment for measuring tool temperature. The lathe tool was electrically insulated from the body of the machine. The cold end of this lathe bit was connected to a section of the actual work material being machined and that junction was kept immersed in a bath of ice and water to provide the cold junction for the thermocouple circuit. One lead ran from this cold junction to the recording micro-ammeter (connected as a millivoltmeter) used in measuring the



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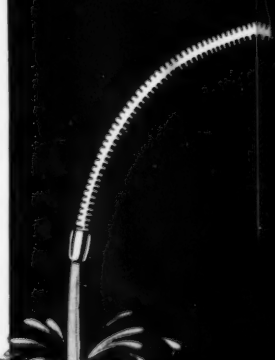
**A Production-Proved
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THE CINCINNATI MILLING
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for

85%

OF ALL METAL CUTTING JOBS





2. A freshly ground tool . . . and a tool which has failed in the test. Temperature values were averaged for the course of each run to obtain the mean temperature of the chip-tool interface for that run.

thermocouple emf. The connection to the work material was made through a copper disc attached to the work and running in a trough of mercury. A lead from the mercury bath went to the other side of the recording micro-ammeter, completing the circuit. A very low resistance recording micro-ammeter was used as a millivoltmeter in measuring the thermocouple emf, so that the electrical conductivity of the cutting fluid would produce negligible error in the emf measurements. By calibration of the tool-work thermocouple combination in a furnace, the emf recorded by the micro-ammeter could be

converted directly into actual values of temperature at the chip-tool interface.

The temperature at the chip-tool . . .

interface was recorded constantly throughout the life of the cutting tool when machining at a series of cutting speeds. The time required for the tool to fail at each speed was also recorded, thus providing values of tool life at a series of cutting speeds. The end point for tool life was taken as complete failure of the tool according to standard practice as described in AMERICAN STANDARD ASA B5.19-

KNOW YOUR STEEL

by Professor Herman Reichardt, Consulting Engineer

Count ten for each question you answer correctly. 80-100 is excellent; 60-70 is good; 50 or below . . . hmmm, you'll probably do better on the gear quiz in another section of this issue.

1. Process annealing is heating alloys to near critical temperature and cooling **rapidly** or **gradually**? _____
2. Bark on steel is the **scale** or **layer underneath scale**? _____
3. A billet is an ingot reduced to an **approximate size** or **size not predetermined**? _____
4. Blue annealing is produced by **rapid** or **slow** cooling? _____
5. Overheating **hardens** or **softens** metal? _____
6. Pickling metal is **hardening** or **cleaning**? _____
7. Pit is an **internal gas pocket** or **external depression**? _____
8. Scarfing is **flattening metal** or **removing seams**? _____
9. Shortness is **soft** or **brittle** metal? _____
10. Skelp steel is **tubular** or **flat in shape**? _____

Answers to quiz on page 298

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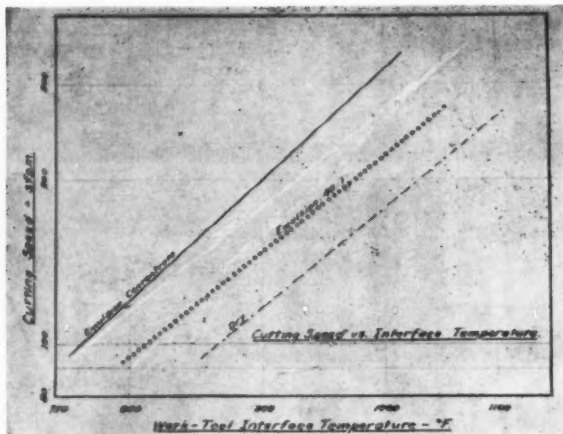
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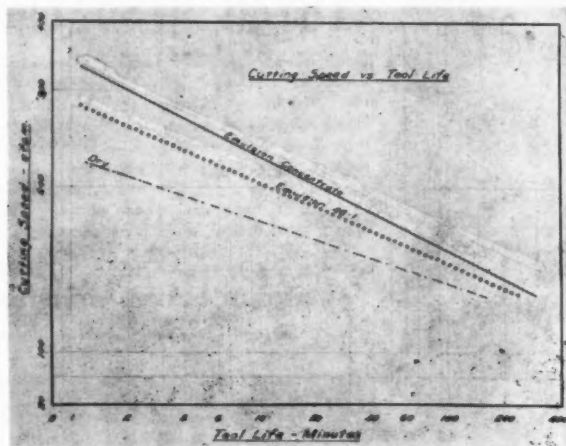
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3. The mean temperature values . . . plotted as a function of cutting speed for the case of dry-cutting and for a 40:1 mixture of chemical emulsion with water as well as for emulsion concentrate.

4. Tool life values obtained . . . corresponding to the temperature measurements plotted in figure 3.



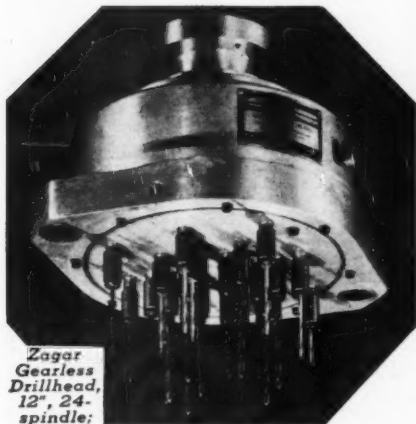
1946 "Life Tests of Single Point Tools Made of Materials Other Than Sintered Carbides." Figure 2 shows a freshly ground tool and a tool which has failed in this test. Temperature values were averaged for the course of each run to obtain the mean temperature of the chip-tool interface for that run. Figure 3 shows these mean temperature values plotted as a function of cutting speed for the case of dry cutting and for a 40:1 mixture of chemical emulsion with water as well as for emulsion concen-

trate. It may be seen that for any given cutting speed, tool temperature is highest for dry cutting, considerably lower for the 40:1 mixture and still lower for the emulsion concentrate.

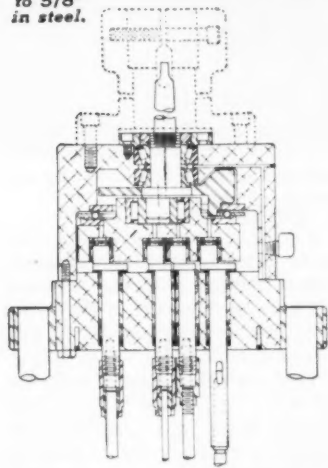
Lower tool temperature and you increase tool life

Figure 4 shows the tool life values obtained corresponding to the temperature measurement plotted in figure 3. It may be seen by comparing figures 3

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and 4 that, for any given cutting speed, as tool temperature was lowered by changing the cutting fluid, tool life increased greatly. For instance, at a cutting speed of 150 feet per minute the decrease in tool temperature of approximately 50°F which took place in going from dry cutting to the 40:1 mixture of chemical emulsion resulted in a 2½ fold increase in tool life. Thus low tool temperature means long tool life in machining, and vice versa. This is logical since high tool temperature reduces the strength of the cutting tool material and makes it more subject to wear and abrasion in the cutting process. It is the action of a cutting fluid in cooling a cutting tool and in reducing the rubbing friction between the chip and tool (and thereby the heat generated in cutting) which enables it to prolong tool life in machining.

Let's look into the metal cutting process

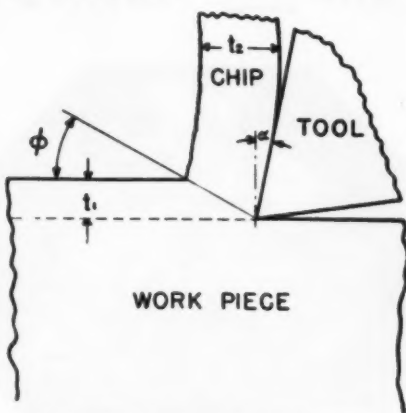
In view of the importance of controlling the heat generated in cutting, evident from the foregoing, it may be interesting to look into the metal cutting process to see what goes on when chips are formed and how heat is generated. By examining the schematic diagram, figure 5, two sources of heat generation can be noted in the metal cutting process:

1. the deformation of the metal ahead of the cutting tool. This shearing of the metal generates heat;
2. the chip, once it has been formed, escapes by sliding up the tool face, encountering a considerable amount of friction.

All of the heat generated in metal cutting stems from these two sources, about 75% of the heat comes from the deformation of the metal, and 25% from the friction between chip and tool.

A cutting fluid, therefore, may reduce the rubbing action of chip against tool—it may be said to “lubricate”—and

$$\text{Cutting Ratio} = t_1/t_2$$

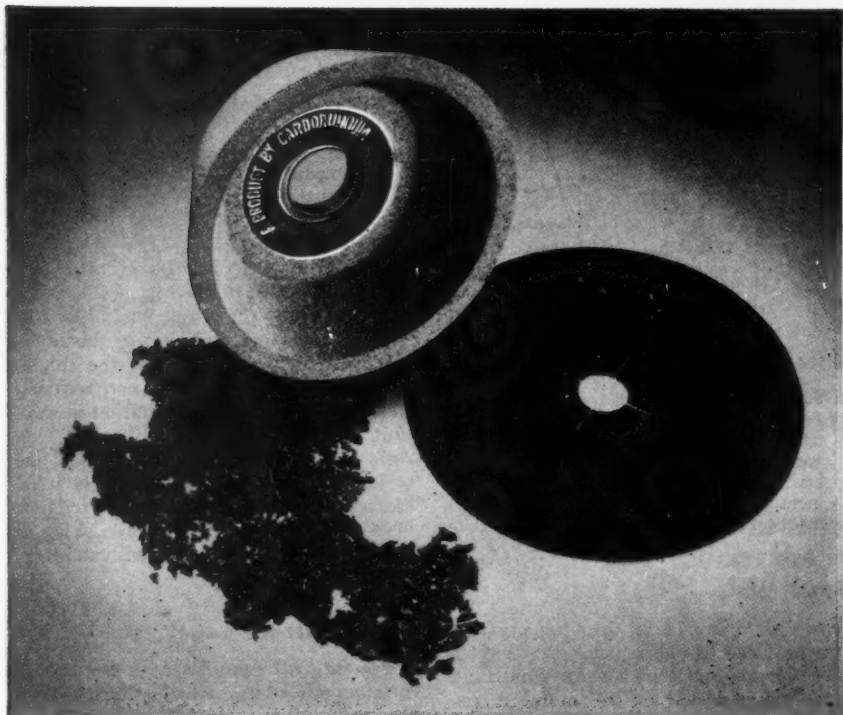


5. Schematic detail of the two processes . . . which produce heat in machining: deformation of the metal and sliding of chip on tool. Diagram also illustrates how deformation of metal takes place on the shear plane.

thus eliminate a portion of the generated heat. However, how does a cutting fluid reduce the heat generated by the deformation of the metal?

You will note, from figure 5, that the chip is formed by shear, or plastic deformation, along a plane running from the cutting edge up to the work surface; all deformation occurs in that narrow region, called the “shear plane,” and the angle which it makes with the direction of the tool travel is designated by the Greek letter “phi.” As this shear angle varies it changes the amount of deformation of the metal, consequently reducing the amount of heat produced, figure 6.

With a small shear angle the plane on which the deformation occurs (shear plane) runs out far ahead of the tool. This results in a small, thick chip, and



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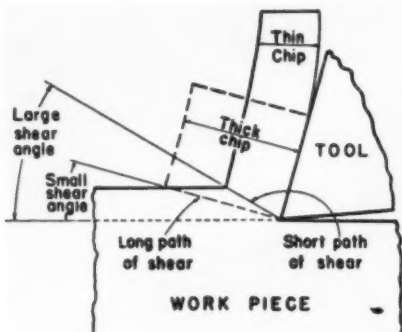
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80-15



6. Size of shear angle . . . controls the amount of deformation of the metal. As friction of the chip on the tool face decreases, the shear angle becomes larger; as friction of the chip on the tool face increases, the shear angle becomes smaller.

severe deformation of the metal resulting in large amounts of heat. With a large shear angle the chip is small and long; deformation of the metal is reduced, and less heat is generated. Hence, it is important to have as large a shear angle as possible to reduce heat.

When we study cutting fluids in relation to the shear angle an interesting fact emerges. The size of the shear angle is controlled directly by the friction on the tool face. The lower the friction, the larger the shear angle. If you apply a cutting fluid you reduce the friction between tool and chip, and so reduce the heating due to friction. However, at the same time this reduction in friction causes the shear angle to rise from a small value to a large value. Consequently, the heat coming from deformation of the metal is also reduced; the two are related. Reduce the rubbing friction on the tool face and the deformation of the metal and

the heat generated thereby is also reduced.

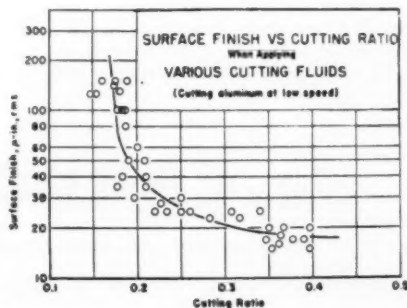
Measuring deformation of metal . . .

is accomplished by a quantity known as the "cutting ratio." If the shear angle is low, then the thickness, t_2 , of the chip will be much greater than the thickness, t_1 , of the layer of metal which the tool is removing; if the shear angle is high, the chip thickness will be more nearly equal that of the layer of metal. Thus, the ratio of the thickness t_1 to the thickness t_2 can be used as a measure of the deformation in cutting, and so of the shear angle. This ratio is called the cutting ratio. Because of its relation to the shear angle it is, indirectly, a measure of the friction between chip and tool. When friction is decreased, cutting ratio will increase, and vice versa.

The "built-up edge"

You are all familiar with that mass of stagnant metal which builds upon the nose of the tool. It plows ahead through the metal and forms the chip.

7. As the cutting fluid reduces the friction . . . measured by the cutting ratio, the built-up edge on the tool becomes smaller and thus improves the surface finish.



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This built-up edge results when friction between chip and tool is high. This edge is a source of trouble because it affects surface finish adversely. Portions of the lower end of the built-up edge shear away and leave step-like fragments on the surface, causing the rough, torn appearance of an ordinary machined surface. However, if the friction on the tool face is reduced, the size of the built-up edge will be reduced; therefore, the lower the friction between chip and tool, the better the surface finish. Figure 7 illustrates this fact.

Cutting ratio is used as a measure of chip friction. The material is aluminum. As the chip friction was reduced, through application of various types of cutting fluids, an improvement in surface finish resulted. Such data show

how cutting fluids provide control of surface finish as a result of friction reduction, in addition to providing control of heat.

Cutting fluid controls chip friction

Referring again to figure 5, it seems hardly possible that a cutting fluid can get between the chip and the tool to reduce friction. However, if one should enlarge a small portion of the chip-tool interface, it would look somewhat as shown in figure 8. No tool face is ever a perfect plane; there will always be hills and valleys. As the chip moves up the tool face it contacts only the hills and as a result there will always be a network of capillaries in between the chip and the tool. These capillaries draw in the cutting fluid, and by this means

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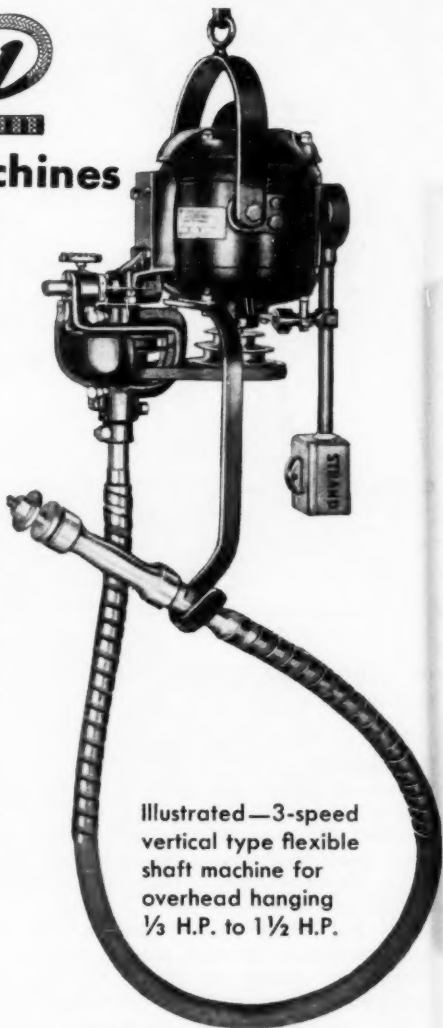
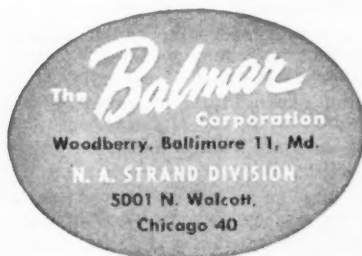


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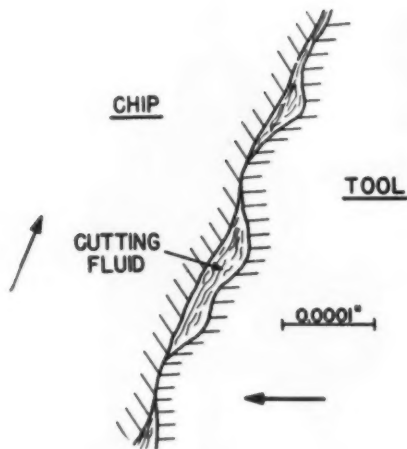


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8. Note the hills and valleys . . . existing on the tool face. The cutting fluid is drawn into the valleys and by means of chemical reaction with the chip metal produces a "solid lubricant".

the cutting fluid penetrates the chip-tool interface.

The conditions that beset the cutting fluid when it reaches the chip-tool interface are severe: the pressures on the points of actual contact run several hundred thousand pounds per square inch; local flash temperatures at those points also run high; further, the geometry of the system offers no possibility for wedge-film formation. In addition, due to the high contact pressures, any liquid, as such, will be squeezed out from between the contact points.

Experimental data shows that fluid-film lubrication plays no part in the process of friction reduction in metal cutting; furthermore, the friction reducing abilities (as measured by the cutting ratio) bear no relation to the viscosities of the fluids. In fact, some

of the most effective of them have very low viscosities. Consequently, water, oil, or other fluids which remain liquid at the chip-tool interface cannot provide lubrication or friction reduction between chip and tool.

An effective cutting fluid reduces chip friction by an action called "solid-film" lubrication. This is provided by a film of solid material at the chip-tool interface, which cannot be squeezed from between the contact points. This solid film is produced by chemical reaction, accomplished by chemical additives carried in the water or oil used as the vehicle. The combination of high pressures, high temperatures, clean surface of chip, are ideally suited to produce chemical reactions between the additives and the chip metal, forming films of low strength solid materials. These solid films prevent metal-to-metal contact at high points and so allow for sliding of chip on tool.

Cutting fluids must be tailored . . .

to contain additives which have proper chemical reactivity and which form proper reaction products at the chip-tool interface. Yet their reactivity must not be so great as to attack the work material; they must be unreactive at atmospheric temperature and pressure; they must become reactive at the temperatures and pressure existing at the tool face.

Speeds have an important effect on the effectiveness of cutting fluids. At low speeds considerable benefits can be obtained from chemical action. As cutting speeds increase there is less time for the cutting fluid to penetrate the chip-tool interface—less time for it to react—and so friction reducing ability falls off quickly. At speeds of about 100 fpm, the chemical action is less effective than at low speeds; at speeds of about 400 fpm, such as are used with carbide tools, chemical reaction just about disappears. Only fluids having high cooling

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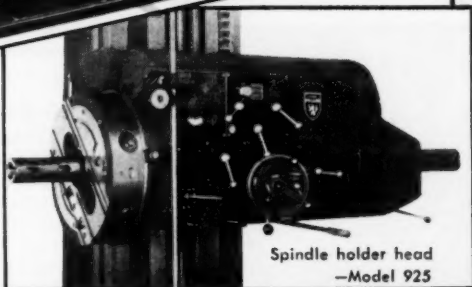
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ability, such as water, maintain a high value of cutting ratio and this is due, not to the chemical action but to that good cooling ability, which affects the plastic properties of the metal. Thus at high cutting speeds good cutting ability is of prime importance, while at low cutting speeds good friction reducing ability is required. An all-round cutting fluid must combine both those properties to the highest degree.

While many of the fundamentals of the action of cutting fluids are quite clear, there is much yet to be learned; with continuing research of this kind

many answers now shrouded in mystery will be brought to light.

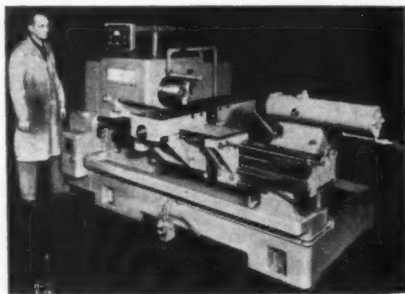
It is a pleasure to acknowledge the contributions made by many of the members of the Research Dept. of the Cincinnati Milling Machine Co. in the research reported here, and in particular the important part played by Mr. D. M. Cunningham and Mr. R. E. Phillips, who carried out the experimental study of tool temperatures in relation to tool life described in the early part of this article.

The End.

Part 2. Descriptions of late model Lathes

Sundstrand 12A automatic lathe

Adequate hp with automatic cycling and multiple tooling make it possible



to shorten cutting stroke and cutting time for long runs when using the 12A, made by Sundstrand Machine Tool Co., Rockford, Ill. Quick cycle changeover reduces machine set-up time so that the same production advantages can be obtained for short runs. Complete control of all cycles is provided by adjustment of dogs on a disc, thus the making of cams is eliminated. Changing of position of dogs on disc changes length of rapid approach, feed and rapid return

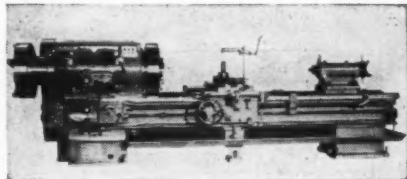
stroke; further, it enables operator to set up cycle quickly and change over from one job to another.

Wide speed and feed range for handling all types of cutting materials and work pieces is provided.

Hollow spindle Hydratrol

These lathes, made by Lehmann Machine Co., St. Louis 3, Mo., provide a complete size range with spindle holes ranging from 2½" up to 16" dia. Hollow spindle Hydratrols are fitted to the same bed, carriage and tailstock as the standard Hydratrols. All standard attachments are interchangeable in their corresponding size range.

Speed changes are hydraulically made by a rotary selector valve, giving immediately any one of 16 forward, and eight reverse speeds. Other features include: automatic slide rule indicates





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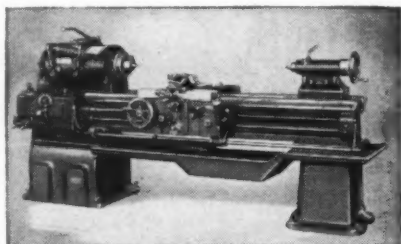
A FILE FOR EVERY PURPOSE

spindle speeds, operation numbers and cutting speed in feet per minute; hydraulic friction clutches and hydraulic brakes; automatic safety relay.

Boye & Emmes 16" heavy duty engine lathe

The headstock casting of this lathe, made by Boye & Emmes Machine Tool Co., Cincinnati 15, O., is heavy and well ribbed. All gearing is contained in the lower half of the unit, the cover serving only as an oil retainer and support for the two shifting levers.

Transmission is so designed that the gears are at all times in constant mesh.



This prevents any burring or tooth chipping that might occur when sliding gears into mesh. Speed changes are accomplished through massive position jaw sliding clutches.

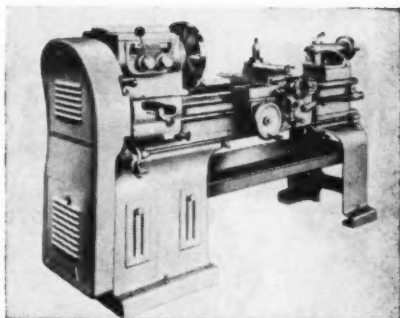
A combined splash and pumping system provides ample and positive lubrication to all gears and bearings.

Back gears are mounted in front of the spindle and are used for sixteen of the twenty-four or eight of the twelve speeds.

Quick-change gear box is of the B & E type. Main casting is one piece, entirely enclosed, having no slots or openings to receive chips or turnings from the cutting tool.

Sebastian lathes type R

These general purpose lathes are made by Lathe Div., Cincinnati Metalcrafts, Inc., Cincinnati, O. Tapered roller bearings (pre-loaded) are on all shafts in headstock, including spindle. Oversize, heat-treated steel gears are



in the headstock; automatic splash lubrication.

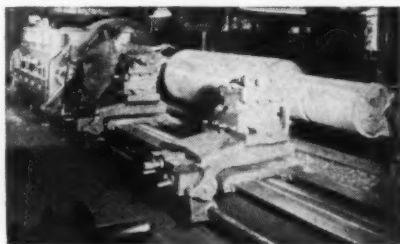
Neutral point in the head permits revolving spindle freely by hand for chucking work. Provided is an apron control for start, stop, and reverse of lathe spindle. (Standard on lathes with 10', 12' and 14' beds.) Reverse in the apron for feeds.

This lathe, as well as all Sebastian lathes, are equipped with 8-speed geared headstock.

Screw feed roll lathe

The arrangement of the headstock gearing in this lathe, made by Mackintosh-Hemphill Co., Pittsburgh 3, Penn., and the position of the face plate pinion, in relation to the tool, results in a balanced arrangement of the forces acting on the face plate bearing, and also on the bearings of the steady rests. Thus a stable face plate is accomplished by balancing the forces on the face plate pinion and cutting tool.

The carriage is designed for extra heavy work and has unusually large



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T-P Cylindrical Plug Gage, chromium plated

T-P Emmerton Ball Bearing Plug Gage

T-P Cylindrical Plug Gage with gaging surface of Norbide*

T-P Reversible Plug Gage with adjustable length, positive lock

T-P External Ring Gage with insert gaging surface of tungsten carbide

T-P Style 9324 AGD Flange-type External Ring Gage of hardened alloy steel

*Norbide (Boron Carbide), Trademark of Norton Co., Reg. U. S. Pat. Off.

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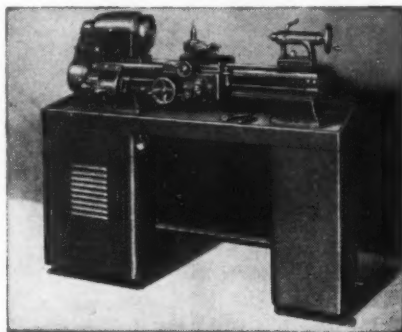


THE TAFT-PEIRCE MFG. CO.
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bearing surfaces. Carriage feeds are motivated by a heavy screw, mounted on the bed directly under the tool, making possible steadier feeds by eliminating twisting and binding of the carriage.

Logan 11" quick change gear lathe

Logan Engineering Co., Chicago 30, Ill., has introduced its series of 11" swing, quick change gear lathes, on a pedestal base. These versatile machines are provided with 1" collet capacity, 1 3/4" spindle hole, and center distances of 24" and 36". A feature is the ball bearing spindle mounting which re-

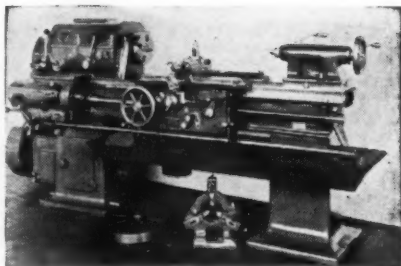


quires no adjustment for any spindle speed from 45 to 1500 r.p.m. The bed is provided with two v-ways and two flat ways, precision ground to a tolerance of .0005". Self-lubricating bearings lengthen the service life of the lathe and reduce maintenance costs by protecting against wear.

The Model 955, illustrated, sits on a compact pedestal base, with no protruding parts, making it adaptable to multiply installations and in comparatively limited space. These Logan lathes are provided with completely enclosed design, assuring operator safety.

Western's Chard multi-speed lathes

There are several interesting features about this lathe, made by Western Machine Tool Works, Holland, Mich. The gearbox is located at the head end cabinet leg, and contains four changes of



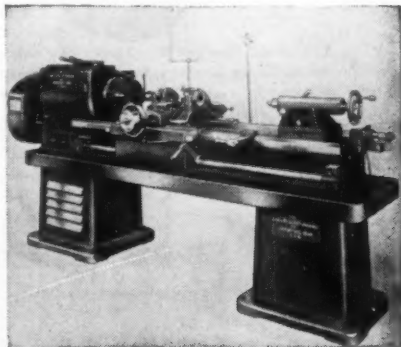
speed, the start-stop clutch mechanism, spindle brake, and chain sprocket for driving direct to the spindle in the headstock above. Thus having the high speed gearing close to the floor isolates vibration, reduces stresses in headstock casting.

Forced-feed filtered lubrication, and adequate oil seals, are provided to all bearings, with provisions for return flow to the oil sump in the leg.

The cross slide is of the inverted Vee type permitting more metal to be added through the bridge and adding materially to the rigidity of the unit. A trough is provided entirely around the carriage to carry off cutting lubricant.

Coulter automatic threading lathe

The new Automatic Threading Lathe, Model L-1 is a recent development of The James Coulter Machine Co., Bridgeport 5, Conn. This unit is equipped with a four-speed headstock, giving a wide range of speeds to accommodate



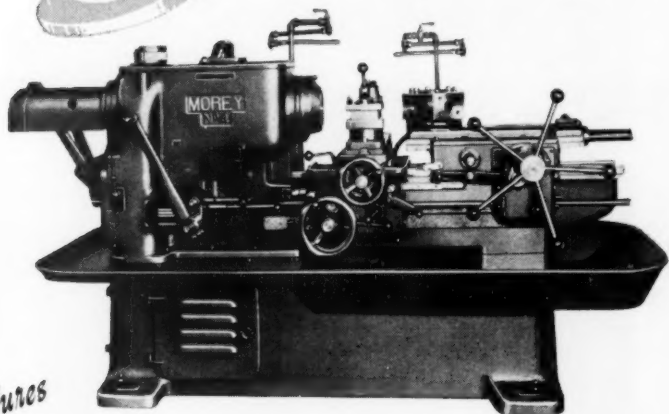


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No. 3 Universal.....	1½" x 10"	16½"	5 HP
No. 4 Universal.....	2" x 12"	19½"	7½ HP
No. 5 Universal.....	2½" x 14"	21½"	15 HP

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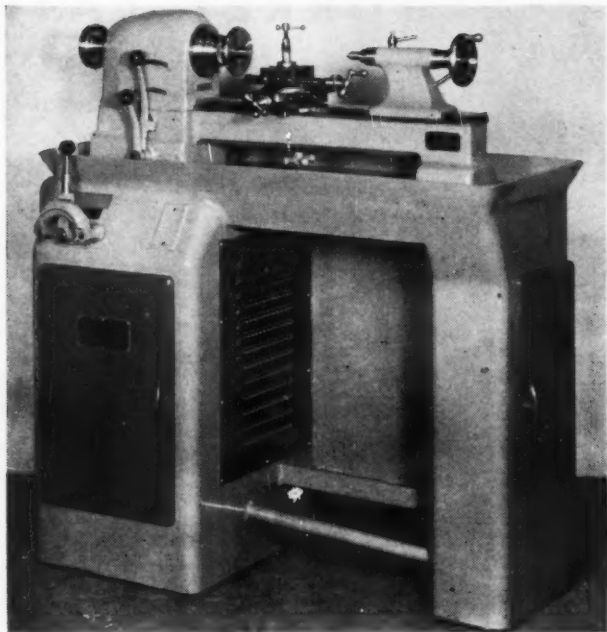
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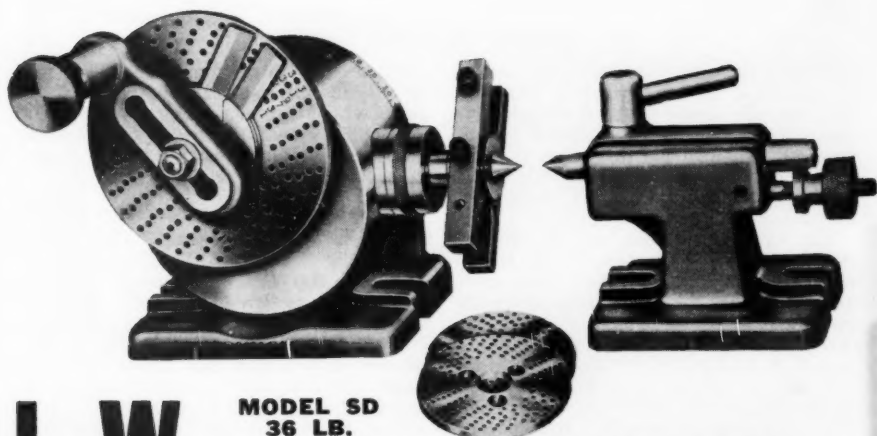


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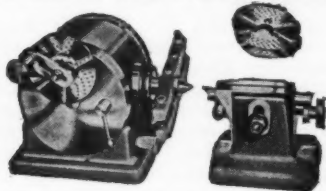
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the large range in diameters and variety of materials to be threaded. The return or idle travel speed has been increased to five times the cutting speed, thereby reducing the threading time of the work. All shafts are mounted on anti-friction bearings with preloaded Timken bearings on the spindle.

The various methods and number of threading tools which can be arranged on the tool slides, both front and rear, make this unit particularly versatile for the production of square, standard and 29° threads, both external and internal. A feature of the Coulter Model L-1 is the clapper box threading bar holder, especially desirable when using plug gages. It obviates the necessity of disarranging the automatic stops and saves the time required to run the carriage back far enough to use gages conveniently.

Betts-Bridgford heavy duty lathe

The Betts-Bridgford heavy duty, geared head lathes are manufactured by Consolidated Machine Tool Corporation, Rochester 10, N. Y. They are provided in 42", 48", 54", 60", 72", 84", 96" (illustrated), 120", 144" sizes, and larger.

The headstock is of simple design, with selective speeds, geared. It is fully enclosed. The spindle is an accurately finished steel forging, provided with a flange to which the faceplate is bolted after being keyed and pressed into action. The spindle is mounted on anti-friction bearings. The bed is a close-grained semi-steel casting, and is furnished with either flat or v-ways. The carriage is a compact unit with a wide bridge and long bearing area on the bed ways, designed for extra heavy

service. The large diameter leadscrew is of high carbon steel; threads are used only when thread cutting, as the feed for plain turning is through spline in the leadscrew and gearing in the apron to a steel rack on the bed.

Stark series 400 precision lathe

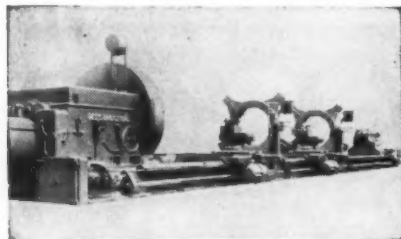
The Series 400 Precision Lathe, made by Stark Tool Co., Waltham, Mass., features the Stark patented integral drive. This is driven smoothly by a ¾ h.p. motor, either of regular open type or by a gear motor through a disc clutch; it provides any speed between high and low with a single control, a hand-wheel located in front of the operator. The variable v-belt sheaves drive to the countershaft and thence through double v-belts to the headstock spindle.

The slide is 11" in length, travel 3⅞", permitting ample bearing area and maintaining alignment. More than 30 precision attachments are available for the Series 400 lathes. A screw cutting attachment is mounted on the back of the lathe in accurately milled slots. The toolblock swings out of the way without removal. It cuts accurate threads of all forms, and grinds hardened ones up to 2½" length.

Simmons heavy duty lathe

Built in 48" and 54" sizes, the Heavy Duty, All Geared-Head Lathe manufactured by Simmons Machine Tool Corporation, Albany 1, N.Y., has been produced to meet the demand for rigid, powerful units required by railroads, shipyards and other large industries requiring extra heavy metalworking operations. The Simmons headstock is of simplified design to provide the required range and number of spindle speeds with a minimum of wearing parts. It is fully enclosed and all bearings and gears are constantly lubricated from a positive-pressure oil pump which delivers filtered oil. The headstock has long bearing on the bed ways, insuring rigidity and strength.

The spindle is a steel forging, heat treated, accurately turned and ground to size. The spindle bearings, extra long and large, provide a maximum area of bearing surface to compensate for heavy loads.



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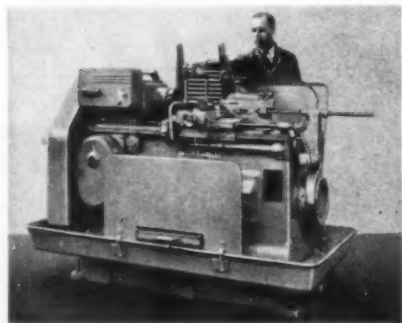
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P & W full-automatic lathe

The Model "C" Full-Automatic Lathe, development of Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford 1, Conn., features accurate turning on centers, automatically. The Full-Automatic is a production lathe which uses either h.s.s or carbide tools. Equipped with higher speeds and feeds

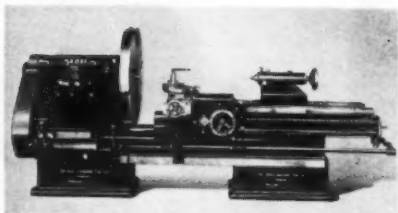


for carbide turning, it also has anti-friction bearings, hardened and ground bed ways, a simplified set-up, maximum cutting tool support and a rapid camshaft drive for minimum non-cutting time. Once it is set up, the Model C requires only reloading of the magazine and normal supervision of the cutting tools.

Provided with a headstock and a footstock with centers, the Full-Automatic also has a magazine for holding the work blanks, and fully automatic work-handling and work-driving mechanisms.

Nebel 20/40" series AG

The bed of this lathe, made by The Nebel Machine Tool Co., Cincinnati 25, O., is made in two sections. The upper bed slides along the lower bed and can be adjusted to any width of gap within the range of the lathe. Center distance is increased in proportion to gap opening. This lathe can be used either as a gap lathe when the gap is open or, when the gap is closed, as a regular engine lathe. A special T-slot construction with steel clamps running the entire length of the sliding bed permits both ends to be clamped solidly



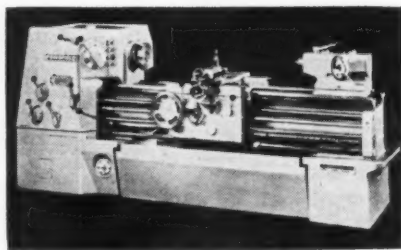
together as one casting at any position.

The headstock is completely equipped with Timken bearings, all enclosed and self-oiling. Carriage is specially constructed so that the tool rest can be brought up close to the gap. It has long continuous bearing on the bed, with wide bridge providing a broad bearing for the tool rest. The front of the carriage is extended allowing for extra travel for the compound rest so that the tool may operate on the largest diameter that can be swung in the gap.

Springfield model S

This lathe, made by the Springfield Machine Tool Co., Springfield, O., has 24 spindle speeds, color coded two lever shifting . . . no "pass through" shifts. Motor cabinet base is entirely enclosed, as is drive and quadrant gearing. There are 4 gears in heavy quadrant. Multiple disc friction clutch is also enclosed and runs in oil . . . provides forward and reverse at apron.

Electrical control panel is of the enclosed type . . . terminal block wiring . . . eliminates standard enclosure boxes. High Pressure filtered mist lubrication to feed box.



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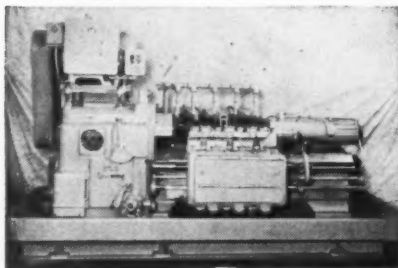
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Seneca Falls Model "AR" Lo-Swing

A recent development of Seneca Falls Machine Co., Seneca Falls, N.Y., is the Model "AR" Lo-Swing automatic lathe. This unit features instantaneous tool relief control with continuous spindle rotation. The Lo-Swing is a positive cam-operated machine which assures



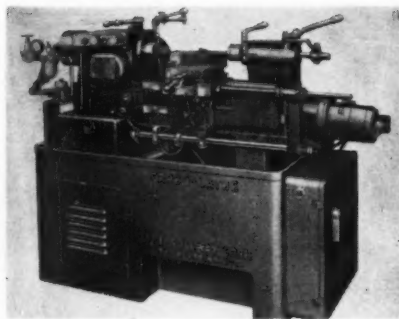
ease in change-over, operating control and considerable flexibility of operation. Increased rigidity, improved spindle mounting and higher spindle speeds are now available to take advantage of fast cutting speeds permitted with carbide tools.

The exclusive "Lo-Swing" feature of these lathes permits reversing the feed drive mechanism at any time during the machine cycle, reducing tool breakage and down time. In case of necessity, the operator pushes a lever, reversing the carriages and tool slides to their starting position without disturbing the timing of the slides or the setting of the tools. Duplicate machine starting levers are provided, to minimize operator's steps. Speed and feed change gears are easily accessible. The quick change-over mechanism permits only 20 to 30 minutes required to change over on the average job.

Lipe-Rollway carbo lathe

The Carbo-lathe, made by Lipe-Rollway Corp., Syracuse, N.Y., has been made fully automatic through the electric auto-cycle attachment, adaptable to all Carbo-Lathes from series 200 up.

With this attachment the operator merely pushes the starting button. The spindle starts, carriage approaches to cutting position, and the mechanical



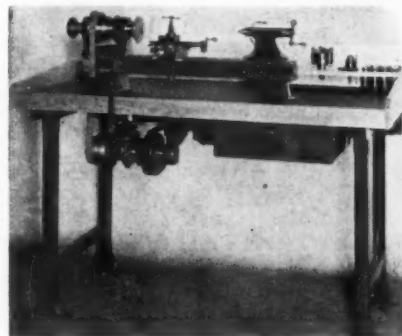
feed automatically engages. At the end of the feed cut, mechanical feed disengages, and the carriage dwells for a predetermined length of time to allow tools to clear themselves. Then spindle stops and carriage rapidly returns to loading position ready for operator to unload and prepare for next cycle.

Ames precision bench lathe

Here illustrated is the Ames No. 3 precision bench lathe with a bench and motor drive unit.

Headstock spindle is hardened and ground, with taper nose, and carries a three step cone pulley. Turns in pre-loaded ball bearings at speeds up to 4000 r.p.m. Draw-spindle with hand wheel has threaded end for tightening collets and chucks into headstock.

Compound slide rest has handscraped slides and adjustable gibs. Top slide travels 5½" and supports tool post.





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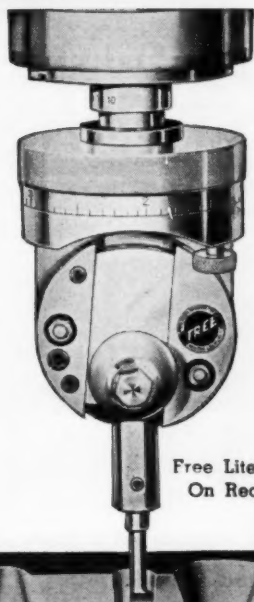
- * Straight boring . . . as shown at left used as offset boring tool.



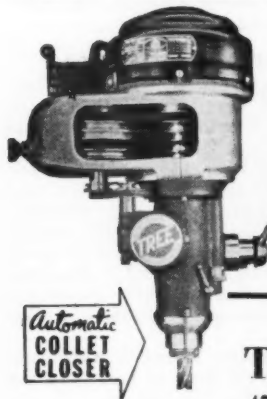
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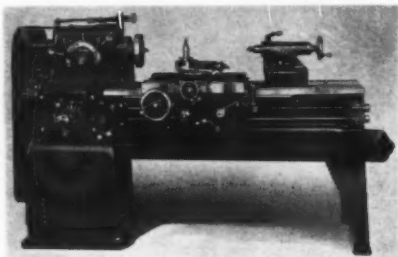
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Swivel for top slide is graduated 50° either side of zero. Bottom slide travels 4". Base of bottom slide bears directly onto bed, has T-slot for hold-down and stop that adjusts and aligns.

Lathe is made by Ames Precision Machine Works, Waltham 54, Mass.

Carroll & Jamieson lathes

This 16", 12-speed lathe is manufactured by The Carroll & Jamieson Machine Tool Co., Batavia, Ohio. Its features include an all geared head with great pulling power to the spindle which is mounted on Timken Precision roller bearings; it permits quicker speed



changes. A separate rod is provided for feed, as the lead screw is to be used only for thread chasing.

Standard equipment on the C & J lathe includes a thread indicator, steady rest, follow rest, face plates, chuck plate, centers and wrenches. The carriage of this lathe is 23 $\frac{1}{2}$ " in length. Lubrication is provided through special oil reservoirs and tubes to the bearings. Rigidity of the unit is assured for dependable, accurate, general purpose cutting.

Hendey general purpose lathe

The Hendey No. 1 general purpose lathe, made by Hendey Machine Co., Torrington, Conn., incorporates the convenience of a modified cone head drive with the added advantage of a single lever spindle speed control from a built-in motor. This conveniently located lever shifter moves the belt on four-step cones mounted on the 3 h.p. reversing motor and on the jack shaft, giving a range of 8 speeds from 30 to 1142 r.p.m. This range covers the speeds

necessary for carbide tools and fine work finish. Power unit and transmission mechanism are enclosed in the cabinet leg below the headstock.

The bedways of this general purpose lathe are induction hardened and precision ground.

Apron is of box-type construction, with splash lubrication to all moving parts. The spindle is mounted on precision antifriction bearings. The spindle nose is either cam lock D-6 or the L-1 long-taper standard with taper end to center plates and chucks.

Wade Tool Co. Lathes

A versatile series of precision tool-maker's and bench lathes is manufactured by Wade Tool Co., Waltham 54, Mass. These standard lathes stress high accuracy; their precision construction assures interchangeability of units; they are designed to accept a wide variety of attachments, permitting the lathes to perform a versatile range of machining operations.

Their features include the Wade self-centering bed, so called because two symmetrical bevelled sides are used for balanced alignment of all units of the lathe; the dovetail type of bed design is dependent on one side alone for the locating surface. The live spindle of the Wade precision lathes is made to receive collets and other work-holding chucks and fixtures without any other adaptation being necessary.

Axelson heavy duty lathes

Accuracy is stressed in the manufacture of the Heavy Duty Lathes made by Axelson Manufacturing Co., Los Angeles 58, Calif. Six models are provided, ranging from 14" to 32". Standard equipment includes hardened and ground tool steel bedways for the carriage, as well as hardened and ground headstock gears. An anti-friction quick change gear box is provided. Forward and reverse clutch, with automatic positive spindle-action brake is also standard.

The direct drive 24-speed headstock delivers a smooth flow of power to the spindle nose. The lubrication is forced to the spindle bearings, gears immersed; the oil circulates through the filter.

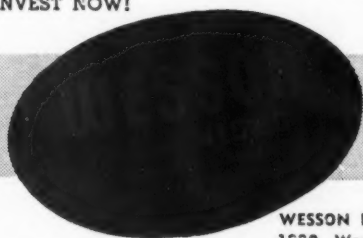
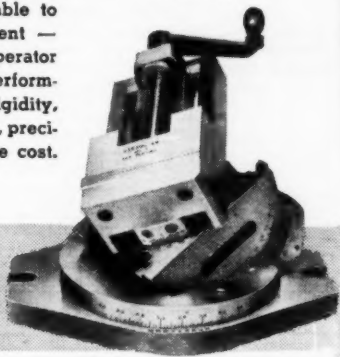


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Part 3 Specifications of American-built machines

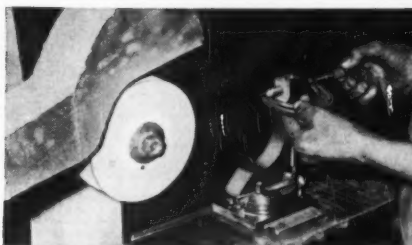
Pratt & Whitney		W. Hartford, Conn.		
Type Size & Model	Swing B=Over Bed C=Over Carriage	Distance between Centers	Horse Power F=No. of and range of feeds S=Speeds	Threading N=No. of threads that can be cut R=Range of threads
Precision Tool Room Lathes				
12"	B=14½"; C=8"	30", 54"	F=60; .0025" to .152"; S=18; 14 to 1000 rpm; 3 hp	N=60 R=1 to 60
14"	B=16½"; C=9"	30", 54", 78"	F=60; .0043" to .256"; S=18; 14 to 1000 rpm; 5 hp	do
16"	B=18½"; C=10"	30", 54", 78"	do 7½ hp	do
Full-Automatic Lathes Model C	18"-length of work, max. (open turning); 2½"-min.; 1½"-dia. of work, max.; ½"-min.		F=.003" to .050"; S=300 to 2630 rpm; 7½ or 10 hp	

The Boye & Emmes Machine Tool Co.		Cincinnati, Ohio		
Type Size & Model	Swing B=Over Bed C=Over Carriage Bridge	Distance between Centers	Horse Power F=No. of and range of feeds S=Speeds	Threading N=No. of and threads that can be cut R=Range of threads
Heavy Duty Engine Lathes				
14"x30" Model AA	B=16½"; C=10¼"	12' 6"	F=63; .00125"-.140"; S=12; 36 to 1080 rpm; 7½-15 hp	N=63 R=2 to 224
16"x30" Model A	B=18½"; C=12¾"	16' 6"	do	do
18"x30" Model B	B=20½"; C=14¼"	18' 6"	F=48; .0025"-.142"; S=12; 12½ to 436 rpm	N=48 R=2 to 112
20"x48" Model C	B=22½"; C=15½"	22'	F=48; .0027"-.154"; S=12; 12½ to 436 rpm	N=48 R=1 to 56
22"x48" Model D	B=24½"; C=17½"	22'	do	do
25"x48" Model E	B=27½"; C=19¼"	24'	F=40; .009"-.250"; S=12; 7 to 301 rpm	N=40 R=1 to 28
32"x60" Model H	B=34½"; C=24½"	23'	F=40; .009"-.250"; S=12; 6 to 250 rpm	do

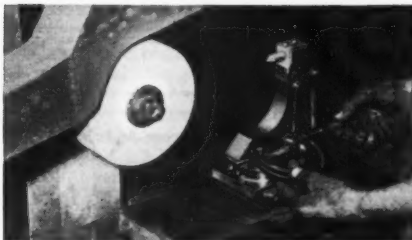
Mackintosh-Hemphill Company			Pittsburgh, Pa.
Type Size & Model	Swing B=Over Bed C=Over Carriage	Distance between Centers	Horse Power F=Range of feeds S=Speeds
Screw Feed Roll Lathe 60"x25'-0"	B=60"; C=60"	25'-0"	F=.048"-.625"; S=400 to 1600 rpm; 50 hp

HOW A J & S "Fluidmotion" WHEEL DRESSER cut production costs FOR THE ADAMAS CARBIDE CORPORATION

Paul C. Boniti, Shaping and Forming Supervisor of the Adamas Carbide Corporation, Harrison, N. J., reports that his standard Model "E" J & S "Fluidmotion" Wheel Dresser has



1 To set-up for convex radius, first mike distance from diamond point to micrometer plate, then add radius desired. (For concave radius, subtract).



2 Slide dresser in dust-proof channel till mike slips over pins as shown and lock with socket wrench. Dresser is now ready for action.



3 Bring diamond point up to center line of wheel, rotate dresser on swivel base in one continuous motion. A clean, accurate radius results! No chatter marks.

OTHER "Machine Shop TIME SAVERS" by J & S
J & S "All-Purpose" Jaw Clamps, KOALA Circular Cutting Tool,
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"Time Savers" Booklet.

- Cut set-up time
- Cut dressing time
(save on diamond and wheels)
- Cut maintenance cost

In 4½ years grinding presintered carbide has cost
\$17.50 to maintain — less than \$4.00 per year.

HOW "Fluidmotion" saves time is demonstrated at left. Photos taken at Adamas Carbide show how a concave or convex radius—accurate to .0001" can be obtained in three simple steps.

Dressing two angles tangent to a radius is simple. Only one more step is necessary. After radius is set (steps 1 and 2) the dresser is swung on its graduated base to first one angle, then the other, and both are locked in with a turn of the knurled knob. Actual dressing is again accomplished in one continuous motion—it is not necessary to move the dresser on dove tails to form the angles.

It is important in our work to have a rigid dresser that can dress a wheel true consistently, leave no chatter marks, and still not have the abrasive content in the presintered material affect the accuracy of the dresser. This I can personally vouch for. J & S "Fluidmotion" in 4½ years has passed this test. I have complete confidence in "Fluidmotion"—no trial and error in order to obtain accurate forms. Our company has enjoyed the lower production cost made possible by "Fluidmotion's" repeated accuracy and ruggedness. It's a cinch to do our grinding jobs.

Adamas Carbide, well known for its high quality, low cost carbide blanks, attributes a fair share of its success in attaining more efficient production to its J & S "Fluidmotion" Wheel Dresser.

You, too, can also cut production costs by employing the J & S "Fluidmotion" Dresser in your tool room.

Application to any surface or cylindrical grinder is quick, simple. Set-up and dressing time is yet the lowest to be found.

Wheel Dressers made to dress wheels accurately up to 36" in diameter, and designed to meet your grinding requirements.

*Reg. U. S. Pat. Off.

For details, write to:

J & S TOOL CO., INC.
471 Main Street, East Orange, N. J.
Representatives in Principal Cities

Cincinnati Metalcrafts, Inc.

Cincinnati, Ohio

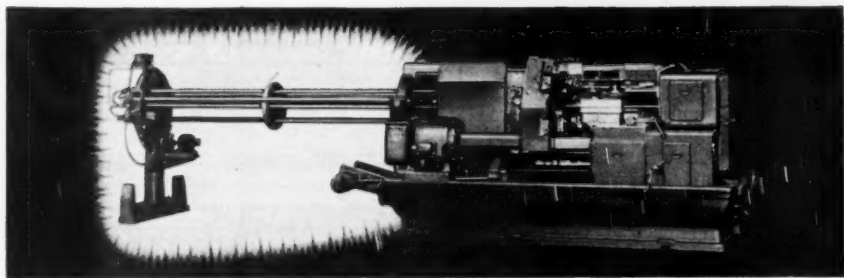
Type Size & Model	Swing B=Over Bed C=Over Carriage W=Over Ways G=Over Gap	Distance between Centers	Horse Power F=No. of and range of feeds S=Speeds	Threading N=No. of threads that can be cut R=Range of threads
Sebastian Geared Head Lathes Standard Type "R" 12"	B=12"; C=8 1/8"	23"	F=57; .0018"- .222"; S=8; 26 to 930 rpm 1 hp	N=57 R=3 to 384
16"	B=16 1/4"; C=10 1/2"	38"	F=57; .002"- .259"; S=8; 19 1/2 to 741 rpm 2 hp	N=57 R=3 to 384
20"	B=20 1/4"; C=14 3/8"	56"	F=57; .002"- .259"; S=8; 14 to 525 rpm 3 hp	N=57 R=3 to 384
16" Gap	W=16 1/4"; G=20 1/4"	38"	F=57; .002"- .259"; S=8; 19 1/2 to 741 rpm 2 hp	N=57 R=3 to 384
20" do	W=20 1/4"; G=29 1/4"	56"	F=57; .002"- .259"; S=8; 14 to 525 rpm 3 hp	N=57 R=3 to 384
Special Type "R" Gap Lathes 16" and 20"	Same specifications as Standard Gap Lathes, with the following additions: 16": swing over gap-23 1/4"; 20": swing over gap-29 1/4".			
Special Type "R" Lathes with Clutch & Brake, 12", 16", & 20"	Same specifications as Standard Type "R" Lathes.			
Special Type "R" Lathes with Metric Screw, 16" and 20"	Same specifications as Standard Type "R" Lathes except for the following: thread range-.25 MM to 6 MM; feed range-.0005 MM to .0658 MM; number of thread changes-16; number of feed changes-57.			

Seneca Falls Machine Company

Seneca Falls, N. Y.

Type Size & Model	Swing W=Over Ways B=Over Bed FR=Over Front & Rear Slides C=Over Carriage	Distance between Centers	Horse Power F=Feeds S=Speeds
Semi-Automatic Lo-Swing Lathes 4"	W=9 1/4"; C=6 1/4"	15", 36", 60", 84", 108", 132"	F=.007" to .120"; S=6; 38 to 316 rpm; 5 to 10 hp
8"	W=13 1/2"; C=10"	30", 60", 84", 108", 132"	F=.010" to .166"; S=6; 25 to 325 rpm; 10 to 20 hp
Model AP	B=16"; FR=7"	40", 60", 80", 100"	F=.0043" to .0409"; S=3 groups; 82 to 900 rpm; 15 to 50 hp
Automatic Lo-Swing Lathes Model LR	B=10 1/2"; FR=5 1/2"; C=7"	10", 16", 22", 34", 46"	F=.0006" to .077"; S=3 ranges; 60 to 2000 rpm; 5 to 15 hp
Model AR	B=16"; FR=7"	20", 40", 60", 80"	F=.0055" to .052"; S=3 groups; 82 to 900 rpm; 15 to 50 hp
Model IMP	FR=4 1/2"	8 1/4"	F=.001" to .054"; S=3 ranges; 400 to 5000 rpm;
Model R-14	C=11 1/2" B=16 1/4"; FR=11 1/2";	33"	F=.009" to .047"; S=3 ranges; 24 to 305 rpm; 15 to 75 hp

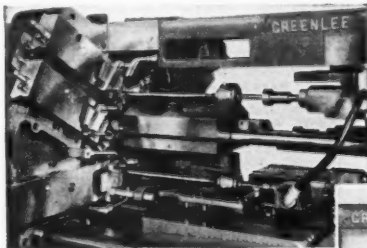
**FEED OUT ANY LENGTH TO 16½"
WITHOUT PUSHER MARKS!**



with GREENLEE AIR-FEED AUTOMATICS

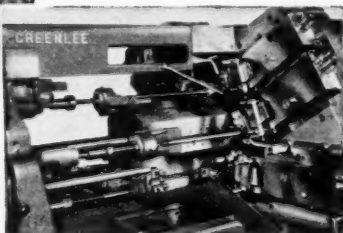
Stock scoring — a necessary evil with conventional feed fingers — has often prevented certain jobs and materials from being handled on automatics, and has resulted in higher production costs. Now stock scoring can be completely eliminated by using Greenlee 1-inch 6-Spindle AIR-FEED Automatics which do away with the usual mechanical stock pusher arrangement. Instead of being gripped, the stock is moved forward smoothly and rapidly by an air-propelled piston in each stock reel tube.

There are other advantages, too. Quicker set-ups are possible by the elimination of stock pusher changes for different size stock. Multiple feed-out arrangements can be easily adapted, requiring only the setting of stock stops and collet openers at the desired feed-out positions. With only the air behind it, the stock will feed out in *any* of five positions to wherever the stop is set. On simple cut-off and form jobs, this permits production of 2 or 3 pieces per cycle. Investigate the Greenlee AIR-FEED for *your* shop.



Left, stations 1, 2, and 3 of a machine set up for multiple feed-out. The piece in this case is 16-3/32" long and requires only forming to a smaller diameter at one end. Live bushings ahead of the stops are used to prevent whipping.

Below, rear view of the same machine, showing positions 4, 5, and 6. The stock feeds out at positions 1, 3, and 5 and is formed. Cut-offs are at positions 2, 4, and 6 and chutes (not shown) are rigged to slide finished pieces away from the working area.



GREENLEE BROS. & CO.
1839 MASON AVE., ROCKFORD, ILL.

MULTI SPINDLE DRILLING, BORING, TAPPING MACHINES • AUTOMATIC SCREW MACHINES • AUTOMATIC TRANSFER PROCESSING MACHINES

Stark Tool Co.**Waltham, Massachusetts**

Type Size & Model	Swing	Distance between Centers	Horse Power Speed
Precision Lathes			
Std. No. 4	9"	20"	$\frac{3}{4}$ hp 160-2200 rpm
Std. No. 4 $\frac{1}{2}$	do	do	do
High Speed No. 4	do	do	$\frac{3}{4}$ hp 260-3500 rpm
High Speed No. 4 $\frac{1}{2}$	do	do	do
Bench Lathes			
No. 2	5 $\frac{1}{8}$ "	6" or 12"	
No. 3	7"	18"	
No. 3 $\frac{1}{2}$	7"	18"	
No. 4	9"	20"	
No. 4 $\frac{1}{2}$	9"	20"	
No. 5	12"	20"	

The James Coulter Machine Company**Bridgeport, Connecticut**

Type Size & Model	Swing S=Over Shears C=Over Carriage	Distance between Centers	Spindle Speeds Horse Power	R=Range of threads
Automatic Threading Lathe Type A Model LI	S=14"; C=6"	27", 51", 99", 123", 147"	30 to 125 rpm; 3 hp	R=1 to 18 per inch

The Springfield Machine Tool Company**Springfield, Ohio**

Type Size & Model	Swing B=Over Bed S=Over Cross Slide	Distance between Centers	Horse Power F=No. of and range of feeds S=Speeds	Threading N=No. of threads that can be cut R=Range of thread
Engine & Toolroom Lathes Model S Heavy Duty	B=18 $\frac{1}{2}$ "; S=10 $\frac{7}{8}$ "	30"	F=60; .0037"- .2228"; S=24; 10 to 1507 rpm; 10-15-20 hp	N=60 R=1 to 60
14" Model 180 Heavy Duty	B=16 $\frac{1}{2}$ "; S=9 $\frac{7}{8}$ "	do	F=60; .0037"- .2272"; S=16; 8 to 919 rpm; 5-7 $\frac{1}{2}$ -10 hp	do
16" do	B=18 $\frac{1}{2}$ "; S=11 $\frac{1}{4}$ "	do	F=60; .0037"- .2272"; S=16; 8 to 949 rpm; 5-10 hp	do
18" do	B=20 $\frac{1}{2}$ "; S=12"	do	F=60; .0051"- .2848"; S=16; 8 to 918 rpm; 7 $\frac{1}{2}$ -10-15 hp	do
20" Model 180 Medium	B=22 $\frac{1}{2}$ "; S=14 $\frac{1}{4}$ "	48"	do	do
20" Model 180 Heavy Duty	B=22 $\frac{1}{2}$ "; S=12 $\frac{3}{8}$ "	do	F=60; .0059"- .3560"; S=16; 8 to 759 rpm 10-15-20 hp	do
25" do	B=27 $\frac{1}{2}$ "; S=17 $\frac{1}{8}$ "	do	F=60; .0058"- .3556"; S=16; 8 to 730 rpm; 10-15-20 hp	do
32" Model 180 Medium	B=34 $\frac{1}{2}$ "; S=22 $\frac{1}{4}$ "	do	F=60; .0033"- .2012"; S=16; 8 to 730 rpm; 15-25-30 hp	do

Axelson Manufacturing Company			Los Angeles, Calif.	
Type Size & Model	Swing B=Over Bedways & Wings S=Over Cross Slide	Distance between Centers	Horse Power F=No. of and range of feeds S=Speeds	Threading N=No. of threads that can be cut R=Range of threads
Engine Lathes				
Model A, 14"	B=16½"; S=10"	30"	F=54; 0.0027" to 0.1665"; S=24; 13 to 1127 rpm; 7½ to 20 hp	N=54 R=1½ to 92
Model B, 16"	B=18½"; S=11½"	do	do	do
Model W, 20"	B=22½"; S=13¼"	48"	F=54; 0.0027" to 0.1665"; S=24; 26 to 1698 rpm; 15 to 20 hp	do
Model D, 20"	B=22½"; S=13¼"	do	F=49; 0.003" to 0.185"; S=24; 9½ to 961 rpm; 10 to 30 hp	do
Model E, 25"	B=28½"; S=18½"	do	F=81; 0.004" to 0.300"; S=24; 6 to 555 rpm; 20 to 40 hp	N=45 R=1 to 30
Model F, 32"	B=34½"; S=19"	do	do	do
Hollow Spindle Lathes				
20"	B=22½"; S=13¼"		F=49; 0.003" to 0.185"; S=24; 6 to 500 rpm; 20 to 30 hp	N=54 R=1½ to 92
25"	B=28½"; S=18½"		F=81; 0.004" to 0.300"; S=16; 2.4 to 308 rpm; 40 to 75 hp	N=45 R=1 to 30
32"	B=34½"; S=19"		do	do
Gap Bed Lathes 32"x100"	B=34½" gap closed; B=100" gap open; S=19	48"	F=81; 0.004" to 0.300"; S=24; 6 to 555 rpm; 20 to 40 hp	do

Logan Engineering Co.			Chicago, Ill.	
Type Size & Model	Swing B=Over Bed and Wings S=Over Cross Slide	Distance between centers	Horse Power F=No. of and range of feeds S=Speeds	Threading N=No. of threads that can be cut R=Range of threads
Back Geared Screw Cutting Lathes				
10" Floor & Bench Models Plain Change Gear	B=10½"; S=6½"	24", 31"	F=.0018" to .1000"; S=12; 30 to 1450 rpm; ½ hp	N=46 R=4 to 216
11" Bench, Floor & Cabinet Models, Plain Change Gear	B=11½"; S=6½"	24", 36"	F=.0018" to .1000"; S=12; 45 to 1500 rpm; ½ hp	N=46 R=4 to 224
Quick Change Gear Lathes				
10" Floor & Bench Models	do	do	do	N=48 R=4 to 224
10" Cabinet Type Screw Cutting	B=10½"; S=6½"	24"	F=.0018" to .1000"; S=12; 30 to 1450 rpm; ½ hp	N=48 R=4 to 224
11" on Pedestal Base	B=11½"; S=6½"	24", 36"	F=.0018" to .1000"; S=12; 45 to 1500 rpm; ½ hp	do
11" Bench, Floor & Cabinet Models	do	do	do	N=48 R=4 to 224

Western Machine Tool Works
Holland, Michigan

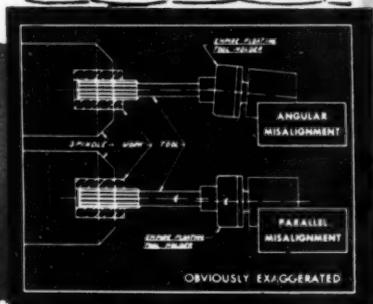
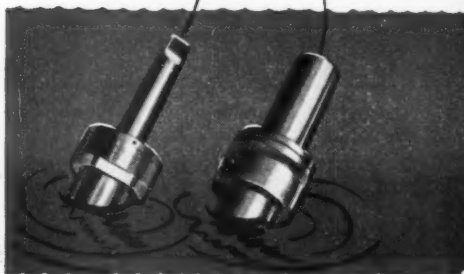
Type Size & Model	Swing V=Over Vees C=Over Carriage	Distance between centers	Horse Power F=No. of and range of feeds S=Speeds	Threading N=No. of threads that can be cut R=Range of threads
Heavy Duty Geared Head Lathes Quick Change Multi-Speed				
16"	V=16½"; C=9¼"	35"	F=64; .0013" to .167"; S=8 or 12; 1800 rpm; 5 hp	N=32 R=4 to 92
18"	V=18½"; C=10¾"	30"	do 7½ hp	do
20"	V=20½"; C=13¾"	28½"	do 10 hp	do

Consolidated Machine Tool Corp.
Rochester, New York

Type Size & Model	Swing W=Over Ways C=Over Carriage	Distance between Centers	Horse Power F=No. of and range of feeds S=Speeds	Threading N=No. of thread that can be cut R=Range of threads
Geared Head Lathes Betts-Bridgeford				
42" Extra Heavy	W=45"; C=34"	60"	F=48; .013"-.736"; S=1.8-192 rpm	N=48 R=¼-28
48" Heavy Duty	W=51"; C=40"	60"	F=48; .013"-.736"; S=1.8-192 rpm	N=48 R=¼-28
54" do	W=57"; C=45"	60"	F=48; .013"-.736"; S=1.8-192 rpm	N=48 R=¼-28
60" do	W=69"; C=48"	9'-0"	F=56; .006-.700"; S=1¼-140 rpm	N=56 R=¼-56
72" do	W=73½"; C=52"	9'-0"	F=56; .006"-.700" S=1¼-140 rpm	N=56 R=¼-56
84" do	W=86"; C=52"	12'-0"	F=56; .014"-1.54"; S=1¼-100 rpm	N=56 R=¼-28
96" do	W=95"; C=65"	12'-0"	F=56; .014"-1.54"; S=1¼-100 rpm	N=56 R=¼-28
96" Extra Heavy	W=101"; C=72½"	12'-0"	F=56; .014"-1.54"; S=1-80 rpm	N=56 R=¼-28
120" Heavy Duty	W=121"; C=90"	12'-0"	F=56; .014"-1.54"; S=.8-64 rpm	N=56 R=¼-28
144" do	W=146"; C=100"	12'-0"	F=56; .014"-1.54"; S=.7-56 rpm	N=56 R=¼-28
60" do with electronic feed	W=70"; C=48"	30'-0"	F=56; .006"-.750"; S=2 to 160 rpm 100 hp	N=56 R=¼ to 56

The Wade Tool Company
Waltham, Mass.

Type Size & Model	Swing over Bed	Distance between Centers	Travel of Tailstock Spindle	Collet Capacity	Horse Power S=Speeds Threads per inch
Standard Precision Bench Lathes					
Model No. 3	7"	17"	3¼"	½"	S=12; 156-3300 rpm; 2 hp; TPI=10
Model No. 5	do	15"	do	¾"	do
Model No. 7 metal or maple top cabinet	do	14"	do	1"	do
Toolmaker's Precision Lathe					
Model No. 8A, pedestal cabinet	8½"	24"	do	do	S=12; 35 to 2000 rpm;



EMPIRE FLOATING REAMER HOLDERS *and* EMPIRE FLOATING TAP HOLDERS

And we do mean float!
These floating reamer and tap holders compensate for both out-of-parallel and angular misalignment and permit tap or reamer to float freely—in and out—and will not freeze under tension caused by drag.

By referring to the drawing you will note that the sleeve and shank float independently of each other—achieving a free and easy movement—a unique engineering design not found in any other floating tool.

With the Empire Floating Tool Holder you'll have no more bell mouths or over-sized holes. Holes can be reamed to close tolerances.

Ask about the Floating-Releasing Tap Holder

- that corrects for both parallel and angular misalignment
- that will not strip threads when tap is pulled out
- that permits adjustments of float to threading—right or left hand.

Send for folders giving full details

EMPIRE
8774 GRINNELL AVE. TOOL COMPANY DETROIT 13, MICHIGAN

The Lodge & Shipley Company

Cincinnati, Ohio

Type Size & Model	Swing W=Over Wings S=Over Cross Slide	Distance Between Centers	Horse Power F=No. of and range of feeds per rev. S=Speeds	Threading N=No. of threads that can be cut R=Range of threads
Engine Lathes,				
14" Heavy Duty	W=16½"; S=10⅞"	30"	F=55; .0007" to .047"; S=24; 14 to 2000 rpm; 5 to 20 h.p.	N=55 R=1 to 256
16"	W=18½"; S=11⅞"	30"	F=55; .0007" to .047"; S=24; 14 to 2000 rpm; 5 to 20 h.p.	N=55 R=1 to 256
20" Standard	W=22½"; S=15½"	30"	F=55; .0007" to .047"; S=24; 14 to 2000 rpm; 5 to 20 h.p.	N=55 R=1 to 256
20" Heavy Duty	W=22½"; S=15"	48"	F=55; .0025" to .160"; S=24; 9 to 750 rpm; 10 to 30 h.p.	N=55 R=1 to 64
25" Standard	W=26½"; S=20"	48"	F=55; .0025" to .160"; S=24; 9 to 750 rpm; 10 to 30 h.p.	N=55 R=1 to 64
25" Heavy Duty	W=27½"; S=18"	48"	F=55; .0025" to .160"; S=24; 7½ to 507 rpm; 10 to 30 h.p.	N=55 R=1 to 64
32" Medium Duty	W=34½"; S=26"	48"	F=55; .0025" to .160"; S=24; 7½ to 507 rpm; 10 to 25 hp	N=55 R=1 to 64
Toolmaker				
14" Heavy Duty	W=16½"; S=10⅞"	30"	F=55; .0007" to .047"; S=24; 14 to 2000 rpm; 5 to 20 h.p.	N=55 R=1 to 256
16"	W=18½"; S=11⅞"	30"	F=55; .0007" to .047"; S=24; 14 to 2000 rpm; 5 to 20 h.p.	N=55 R=1 to 256
20" Medium Duty	W=22½"; S=15½"	30"	F=55; .0007" to .047"; S=24; 14 to 2000 rpm; 5 to 20 h.p.	N=55 R=1 to 256
Oil Country				
25" Standard with 8¼" hole	W=26½"; S=20"	48"	F=55; .0025" to .160"; S=24; 8 to 451 rpm; 10 to 20 hp	N=55 R=1 to 64
25" Heavy with 11½" hole	W=27½"; S=18"	48"	F=55; .0025" to .160"; S=24; 6 to 338 rpm; 10 to 20 hp	N=55 R=1 to 64
Duplicating				
16" Heavy Duty Copymatic	W=18½"; W=9¾"	126" (max. cen. dist.)	F=Same as standard Lathe	
20" Medium Duty	W=22½"; S=13½"	126" do	do	
20" Heavy Duty	W=22½"; S=11¼"	120" do	do	
25" Medium Duty	W=26½"; S=16¾"	120" do	do	
25" Heavy Duty	W=27½"; S=13¾"	120" do	do	
32" Medium Duty	W=34½"; S=21½"	120" do	do	
Automatic				
2A Duomatic	W=17½"; S=9½"	15"	F=4; .003" to .050"; S=50 to 3600 rpm; 7½ to 20 hp	
Chucking				
60" Right Angle	W=60" over bed		F=55; .001" to .064"; S=24; 4 to 338 rpm; 15 to 20 hp	

The Nebel Machine Tool Co.
Cincinnati, Ohio

Type Size & Model	Swing W=Over Bed S=Over Carriage G=Through Gap	Distance Between Centers	Horse Power F=No. and range of feeds per rev. S=Speeds	Threading N=No. of threads that can be cut R=Range of threads
Engine Lathes				
18" Series LN	W=19"; S=13"	30"	F=36; .006" to .131" S=8; 12 to 400 2 or 3 hp	N=36; R=2 to 40 per inch
20" Series AA	W=21"; S=15"	24"	F=30; .005 to .048" S=12; 10 to 320 3 or 5 hp	N=30; R=4 to 40 per inch
25" Series D	W=27"; S=19"	58"	F=33; .015" to .155" S=12; 9 to 280 7½ hp up to 14' bed	N=33; R=4 to 40 per inch
27" Series N	W=29"; S=20½"	51"	F=50; .009" to .329" S=12; 5 to 230 10 hp up to 14' bed 15 hp 14' bed and up	N=50; R=1 to 36 per inch
32" Series F	W=33½"; S=24"	48"	F=45; .013" to .402" S=12; 5 to 230 10 hp up to 14' bed 10 to 15 hp 14' bed and up	N=45; R=1 to 30 per inch
36" Series F	W=37½"; S=28"	do	do	do
18-27" Series LN Removable block gap	W=19"; S=13" G=27½"	30"	F=36; .006" to .131" S=8; 12 to 400 2 or 3 hp	N=36; R=2 to 40 per inch
24-50 Series D Removable block gap	W=27"; S=19" G=41"	58"	F=33; .015 to .155" S=12; 9 to 280 10 hp up to 14' bed 15 hp 14' bed and up	N=33; R=4 to 40 per inch
28-50 Series G Extension bed gap	W=29"; S=20" G=50"		F=45; .009" to .285" S=12; 5 to 230 10 hp 10' to 14' beds 15 to 20 hp 16' to 30' beds	N=45; R=1 to 30 per inch
20-40 Series AG Extension bed gap	W=23"; S=15½" G=40"		F=33; .010" to .101" S=12; 9 to 280 5 hp 6' to 12' beds 7½ hp 14' to 20' beds	N=33; R=4 to 40 per inch

The Carroll & Jamieson Machine Tool Co.
Batavia, Ohio

Model Type & Size	Swings W=Over Bed S=Over carriage	Distance between centers	Horse Power Number and range of spindle speeds	Threads
Geared Head No. 1	W=16¼"; S=11¼"	38" on a 6' bed	2 hp 12 speeds; 14 to 510	3 to 46 per in.
Available in bed lengths of 5, 6, 8, 10, 12, 14 feet				

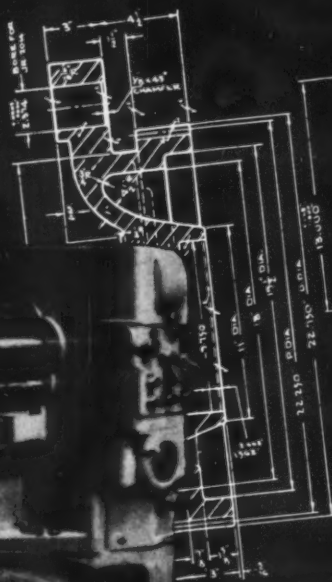
Simmons Machine Tool Corp.
Albany, New York

Model Type & Size	Swings W=Over bed S=Over carriage	Distance between centers	Horse Power F=No. and range of feeds per rev. S=Speeds	Threading N=No. of threads that can be cut R=Range of threads
Engine Lathes				
48" Heavy Duty	W=50"; S=36"	10' 3"	F=32; .006 to .505 30 to 50 hp	N=32; 1 to 14 per in.
54"	W=55½"; S=42"	10' 3"	do	do



NOTE - ALLOW $\frac{1}{16}$ IN BORE DIAMETERS
TO BE BORED TO FINISH SIZES AFTER NITRIDING
DO NOT NITRIDE BORE

TEETH (SPEC)
DIA. PITCH
C100° P. DIA.
(SPEC)



89-CUT
A-DIA
22.250 P
22.750

GEAR SHAPERS
SHAVING MACHINES
THREAD GENERATORS
CUTTERS AND SHAVING TOOLS
GEAR INSPECTION INSTRUMENTS
PLASTICS MOLDING MACHINES

Pays Off!

36-Type Gear Shaper Produces in $\frac{1}{3}$ the Time

Today's demand for quiet, accurate operation must raise the sights of all producers of gears and component gear parts. To meet precision limits in large diameter coarse-pitch gears, modern production equipment such as the all-purpose 36-Type Fellows Gear Shaper, is required.

Recently, one manufacturer replaced 5 outmoded machines with two (2) 36-Type Gear Shapers. The result—better, more accurate gears and, most important, a substantial boost in overall production.

Cost saving is obvious (as shown in the time-performance chart at right) as the result of ability to take heavy cuts at high speed and hold to close limits. Greater flexibility for handling a variety of work is present, along with improved ease of set-up, operation, and 'Change-over'.

If you've a job of precision gear manufacture up to 36" pitch diameter where cost economy and quality of output is important...a thorough investigation of the Fellows 36-Type Gear Shaper is worthwhile. Simply contact the nearest Fellows Office.



Production Performance

LARGE BRONZE GEAR (Top)

Material High tensile bronze #3
Face width 4 inches
Pitch diameter 34.000 inches
No. of teeth 138
Diametral pitch 4
Former Production Time . . 6 hours

vs.

Production Time on

36-Type Gear Shaper . . 1 hr., 35 min.

STEEL SPUR GEAR

Material Steel casting DW-19
Face width 3 inches
Pitch diameter 22.250 inches
No. of teeth 89
Diametral pitch 4
Former Production Time . . 10 hours

vs.

Production Time on

36-Type Gear Shaper . . 2½ hours

PHOTOS AND PRODUCTION DATA COURTESY
SAMUEL W. LANESTON COMPANY, CAMDEN, NEW JERSEY.

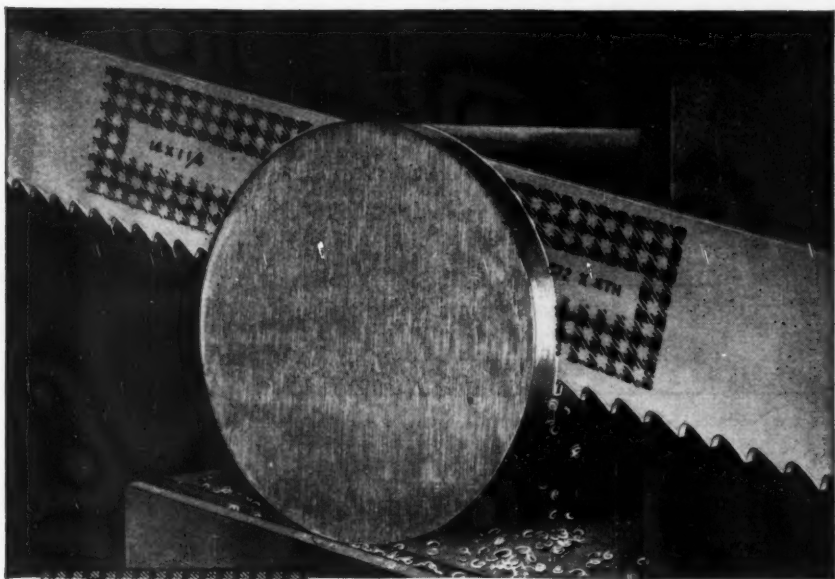
Fellows

THE FELLOWS GEAR SHAPER COMPANY • Head Office and Export Department • 78 River Street, Springfield, Vermont
Branch Offices: 616 Fisher Bldg., Detroit 2 • 5835 West North Avenue, Chicago 39 • 2206 Empire State Bldg., New York 1

The Hendey Machine Co.		Torrington, Connecticut		
Type Size & Model	Swings W=Over Ways S=Over Cross Slide	Distance Between Centers	Horse Power F=No. and range of feeds per rev. S=Speeds (r.p.m.)	Threading N=No. of threads that can be cut R=Range of threads
General Purpose No. 1	W=14½"; S=9"	This No. 1 lathe is built in sizes 12x30", 12x42", 12x54", all with max. swing over ways of 14½".	F=36; .0031" to .1666"; S=8; 30 to 1142 3 hp	N=36; R=½ to 80
No. 2	W=16-7/16"; S=10¼"		F=48; S=8; 30 to 1142	N=48; R=1½ to 92
Toolroom Lathe 9" x 24" Tool and Gauge-Maker	W=10¼"; S=5½"	24"	F=66; S=25 to 3000	N=66; R=2 to 120 t.p.i.
Engine Lathes 18-Speed Geared Head 12"	W=14½"; S=8"	30"	F=36; .0031 to .1666"; S=18; 13 to 1000	N=36; R=1½" to 80 p.i.
14"	W=16½"; S=9½"	do	F=36; .0031 to .1666"; S=18; 10 to 1000	do
16"	W=18½"; S=10"	do	F=36; .0031 to .1666"; S=18; 10 to 1000	do
12-Speed Geared Head 12"	W=14½"; S=9"	do	F=36; S=12; 19 to 598 at 600 2 to 3 hp	do
14"	W=16½"; S=10½"	do	F=36; S=12; 18 to 539 at 600 3 to 5 hp	do
16"	W=18½"; S=12"	do	F=36; S=12; 14 to 478 at 500 5 to 7½ hp	do
18"	W=20¾"; S=12"	do	F=36; S=12; 16 to 570 at 600 5 to 7½ hp	N=36; R=1-56
20"	W=22½"; S=14½"	48"	F=36; S=12; 14 to 560 at 600 7½ to 10 hp	do
24"	W=24½"; S=16½"	48"	F=36; S=12; 14 to 560 at 600 7½ to 10 hp	do
Manufacturing Lathe 4-C	W=16-7/16"; S=9"	30"	F=28; S=12; 30 to 1200	N=28; R=1¼ to 80 p.i.

Ames Precision Machine Works		Waltham, Mass.	
Type Size & Model	Swing Over Bed	Distance Between Centers	Horse Power Speeds
Bench Lathe No. 3	8¾"	17½"	4000 r.p.m. 3-step cone pulley
A bench motor drive unit is available for this lathe; 2 h.p.			

When the chips are down



LENOX

POWER HACK SAW BLADES
are best by every test!

QUALITY . . . The very finest in both
steels and workmanship

SERVICE . . . Prompt Deliveries

TECHNICAL ASSISTANCE . . .
Whenever needed on unusual
or difficult cutting problems

These things we pledge to you. The final test is on
your own machines. Try Lenox for yourself . . . on
any job . . . against any other blade in the world.
Then you be the judge.



LENOX

**AMERICAN SAW
& MFG. COMPANY**
Springfield Massachusetts

HACK SAWS BAND SAWS GROUND FLAT STOCK

Sommerfeld Machine Co.
Braddock, Pennsylvania

Type Size & Model	Swings W=Over Ways S=Over Carriage	Base Length	Horse Power N=No. and range of feeds per rev. S=Speeds (r.p.m.)	Threading N=No. of threads that can be cut R=Range of threads
Engine Lathes				
27" Heavy	W=30"; S=22½"	10 ft.	N=41; .004" to .300" S=16; 50 to 348 15 hp	N=41; R=1 to 30
32" Heavy	W=35"; S=24½"	12 ft.	N=41; .004" to .300" S=16; 5 to 348 20 hp	do
36" Medium	W=37"; S=26½"	12 ft.	N=41; .004" to .300" S=16; 50 to 348 20 hp	do
26" Extra Heavy	W=39"; S=28½"	14 ft.	N=40; .016" to .480" S=16; 1.61 to 200 30 hp turning only	N=40 R=1 to 30
42" Extra Heavy	W=43"; S=31½"	do	do	do
50" Heavy	W=53"; S=39"	18 ft.	N=35; .025" to .710" S=16; .755 to 116 0 hp turning only	N=35 R=1 to 28
60" Heavy	W=60"; S=42"	do	do	do

First Warner & Swasey employee's open house in eight years was attended with equal interest by veteran workers—more than 1000 have been with the company for ten years or more—and their newer fellow employees.

Elaborate working exhibits featured Warner & Swasey machine tools, including the fast-paced Electrocycle lathe shown here, textile machinery, and the Gradall multi-purpose earthmover—all borrowed for the occasion from busy assembly lines. Recruitment was one of the themes of the occasion, to enlist the employees' active aid in securing new workers.





Cut grinding costs . . . with rugged **QUEEN CITY Grinders**

Queen City Grinders are built to stand up under the heavy work that pours through the shop daily. Noted for their durability, freedom from downtime and low cost, Queen City Grinders cut grinding costs to the bone. • Order today a battery of these low cost grinders and eliminate "ganging up" around one lone grinder.

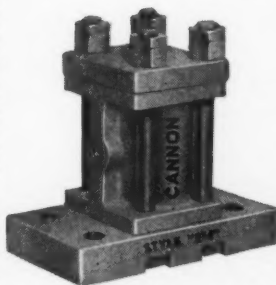
**QUEEN CITY
MACHINE TOOL CO.**

**QUEEN CITY
Machine Tool Co.**
133 E. 2nd St.
Cincinnati 2, Ohio



CANNON *Quiet Type* **VIBRATORS**

PAT. PEND.



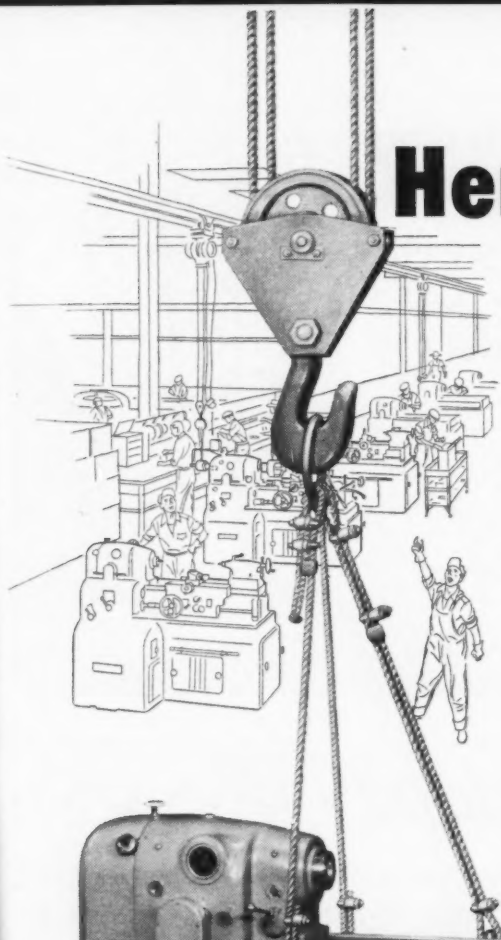
Available in 1 1/4" to 5" piston sizes—12 lbs. to 250 lbs.

Have just what you've been looking for—effective vibration, with less noise and no excessive strain on the vibrator.

Quiet-type vibrators are the most improved air vibrators in over thirty years; guaranteed for continuous or intermittent operation. Vibration is developed by a long piston stroke, with the piston reversing against an air pocket. You will welcome their advantages. Write now.

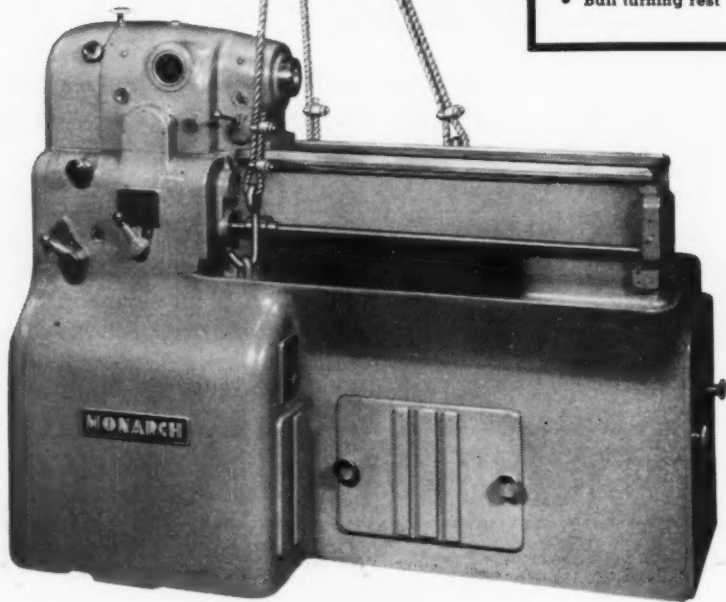
CANNON VIBRATOR COMPANY
1110 Power Ave., Cleveland 14, Ohio

Here's Where



TYPICAL EQUIPMENT

- "Air-Gage Tracer"
- Steady rest
- Follow rest
- Taper turning attachment
- Collet attachments
- Air equipment
- Bar feed attachment
- Collet chucks
- Jaw chucks
- Step chucks
- Stops
- Micro-gaging diameter dial
- Hexagon power feed bed turret
- Hand operated cut-off slide
- Variable feed control
- Ball turning rest



You Come In!

That's right—from here on you can just about write your own ticket! Think of the most exacting assignment for small lathes anywhere along your production lines. Then tell us! We'll deliver a high-speed, sensitive Monarch 10" Model EE—a lathe with an inbuilt productivity matched only by its versatility—and you'll get it with just the equipment and accessories to step up standards for that job.

Note the listing of typical equipment (left). An extraordinarily large choice is available, making it possible for the user to select the ideal combination for the utmost productivity on *his* class of work. The Model EE is equally adaptable for a

wide variety of between center and chucking operations. Note, too, that it can be supplied with the most accurate lathe duplicating method ever devised—the Monarch "Air-Gage Tracer."

These many variations in equipment have been developed solely in response to industry's demands that we make the basic Model EE design available for widening uses. Could anything we say speak better for its design and specifications? Some place—*many* places, perhaps—this outstanding Monarch lathe can improve your production at lower cost. Send the coupon today for full details.....
The Monarch Machine Tool Company, Sidney, Ohio.

FOR A GOOD TURN FASTER...TURN TO MONARCH



THE MONARCH MACHINE TOOL COMPANY, Sidney, Ohio.

Gentlemen: Please send me without obligation your Booklet No. 1003 covering the Monarch Precision Manufacturing Lathe—Model EE.

(It's that new one with 28 pages and a host of those sparkling Monarch illustrations.)

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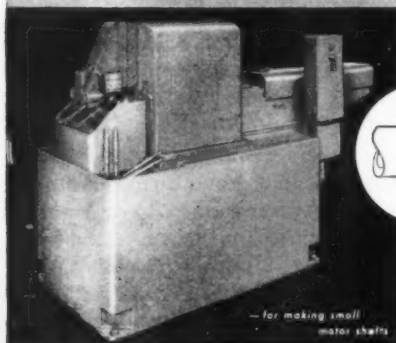
MOTCH & MERRYWEATHER

Cam Automatics-

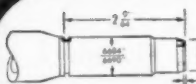
HOPPER LOADING OR BAR FEED

• **COMPLETELY AUTOMATIC** •

**TWO SPINDLES CONTROLLED
BY ONE MAIN CAMSHAFT!**



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motor shafts

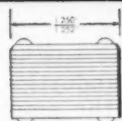


MOTOR SHAFTS

Operation: Turn, neck and chamfer.

Material: Steel tubing.

Production: 1400 pcs/hr. @ 100% efficiency.

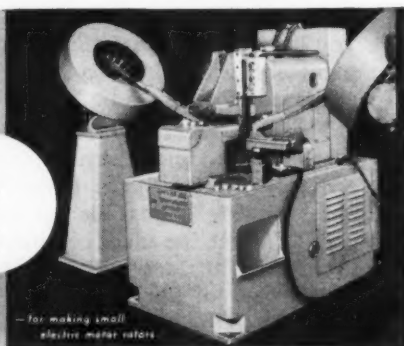


SMALL MOTOR ROTORS

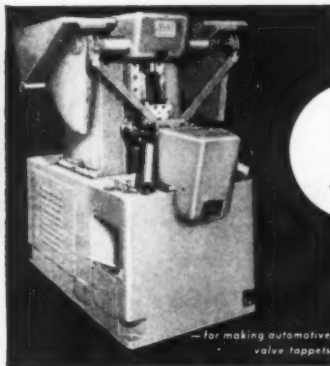
Operation: Turn O. D. and chamfer one end.

Material: Laminated silicon steel.

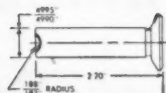
Production: 800 pcs/hr. @ 100% eff.



— for making small
electric motor rotors



— for making automotive
valve tappets



VALVE TAPPETS

Operation: Radius, neck and chamfer.

Material: 5120 steel.

Production: 2400 pcs/hr. @ 100% efficiency.

Stock feed, loading and locating mechanisms, collets and feeds of tool slides are controlled mechanically by a single camshaft — *simplicity itself*. M. & M. cam automatics require minimum attention and only occasional checking of work-pieces. If you will submit your drawings and specifications, we will tell you how Motch & Merryweather cam automatics can increase your production with accuracy.

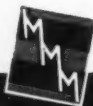
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THE MOTCH & MERRYWEATHER MACHINERY COMPANY

715 PENTON BUILDING • CLEVELAND 13, OHIO

Builders of Circular Sawing Equipment, Production Milling, Automatic and Special Machines

PRODUCTION WITH ACCURACY MACHINES AND EQUIPMENT



Slotting with continuous band type cutting tools

by George H. Sheppard

Director of Research
DeAll Corp.
Des Plaines, Ill.

If the product to be slotted calls for a particular slot width of any size from .025" to .100", continuous band type cutting tools and band machines should be considered. This slotting technique gives high output, minimum tool cost and low unit production cost.

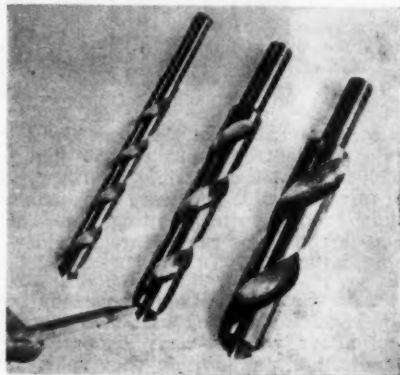
First comparison should be made on the basis of cutting edge length of the band type tools as compared to the length of cutting edge of a circular type cutter. The cutting edge length of band tools ranges from 120" to 238", depending on the size of band machine employed. The great length of these bands in contrast with a small conventional circular type cutter, enables uninterrupted production, eliminates maintenance cost and results in low unit production cost.

For example, when slotting collets and collars, or slotting products such as masonry drills for carbide inserts, parts can be fed into the band tool virtually automatically through the use of air cylinders or hydraulic feed and proper fixturing. This eliminates the costly set-up time which usually accompanies conventional type operation.

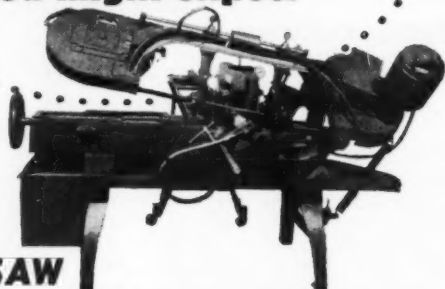
There are several different types of band tools, each having its own characteristics for cutting certain materials and for providing various slot sizes. To determine the size of slot a standard "Raker Set" band tool will cut, it is necessary to start with the known set

dimension of the teeth. If the set dimension is .042", that particular band will cut a kerf or slot of approximately .039". The slot created will always be .022" to .005" less than the actual set dimension. The latter will vary slightly depending on band velocity, work thickness, and cutting rate. Once the exact set dimension, side clearance and side clearance angles are established, the band tool will operate until the cutting edge life has been reached with-

Slotting masonry drills . . . for carbide inserts. Parts can be fed into the band tool virtually automatically.



**Get the advantages of
AUTOMATIC BAR
STOCK CUT-OFF
at a fraction of the cost
you might expect**



**with a
WELLS SAW
and WELLS-O-BAR Feed Master**

A set-up for automatic repetitive cutting need not be prohibitively expensive. By combining a Wells Metal Cutting Band Saw and a Wells-O-Bar Feed Master you can automatically cut any quantity of identical lengths of bar stock with a modest investment. See your Wells Dealer for complete information or write direct.



Products by Wells are Practical

**METAL CUTTING
BAND SAWS**

WELLS MANUFACTURING CORPORATION
707 COOLIDGE AVE., THREE RIVERS, MICH.

out losing excessive slot size. Cutting rates range from 0.125 to 1.50 square inches/minutes depending on the type of ferrous metal, thickness, and surface finish requirement. Cutting rates on non-ferrous type metals are considerably faster.

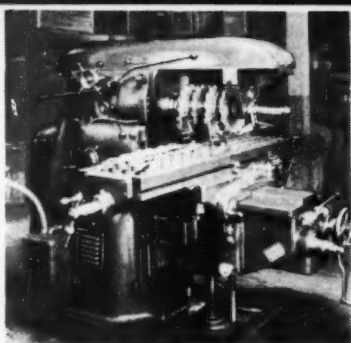
"Line Grinding" Band Tools may be employed for slotting hardened metals and alloys without heat distortion or penetration. In addition they may be

used for slotting products such as glass, porcelain, granite, etc. In this instance the cubical shape abrasive cutting edge will create a slot of approximately .080" to .125" depending on the amount dressed and wear-back.

**Use and maintenance of
carbide tipped lathe centers**

Carbide tipped lathe and grinder centers have pretty much come into their

Here's how **NELCO** Carbide Tipped Tools
increased Production on this
Chilled Iron Casting
OVER 60%!



Facing 4 surfaces of Chilled Iron Refrigerator Door Hinge on #3 Cincinnati milling machine — High Speed Steel Cutter vs. Nelco Carbide Cutter.

HIGH SPEED STEEL

Production — 50 pieces per hour.
Cutters needed frequent repairs.
Down-time increased production cost.

Rejected pieces were excessive due to chilled condition and hard spots in castings.

NELCO CARBIDE CUTTER

Production — 80 pieces per hour.
Resulted in continuous operating time and no rejected pieces.
Production increased more than 60%!

OBJECT: SAVINGS — When you change to Carbide Tipped Tools!

Chilled Iron, Steel, Brass, Bronze, Aluminum, or Alloys can be milled faster, better, more efficiently with Carbide Tipped Tools. There is a NELCO Cutter, Face Mill, Slab Mill to increase your production.

Remember: NELCO Tools are designed with nickel shim brazed carbide tips and alloy steel bodies. Investigate the many other NELCO exclusive advantages. Learn how your production costs can come tumbling down.



WRITE FOR CATALOG and name of your NELCO distributor

NELCO TOOLS

NELCO TOOL CO., INC.

MANCHESTER, CONNECTICUT

For that Extra Edge in Production

own in recent years, not only for precision turning but also for use on heavy lathe work since production records show that it is always possible to exert more pressure on carbide centers without danger of scoring or burning than it is on steel centers. Moreover, carbide tipped centers show great resistance to the wearing action of the abrasive products caused by grinding operations.

In general, production experience

shows, life of carbide centers between reconditionings should be about 50 to 100 times that of softer centers on the average installation. To assure such performance, of course, correct design of the center and proper maintenance are important. For instance, that portion of the center carrying the load should have as close to 100% bearing surface as possible. Further, when doing high precision turning or grinding, lapping the female centers of the work

People work better when they SEE BETTER



In the Bell Telephone Laboratories: Precision machinist working on a milling machine finds Magni-Focuser an invaluable seeing aid.

MAGNI-FOCUSER's matched prismatic lenses give needle-sharp magnification. Comfortably light weight. Fits over regular glasses. Leaves both hands free. Normal vision may be resumed by lifting head.

MAGNI-FOCUSER **SPEEDS PRODUCTION**

Leaves both hands free to work

Precision workers do the job faster and more accurately with a Magni-Focuser—the proven binocular magnifier.

Gauge reading, layout work, inspection, tool and die work are just a few of the jobs that need the Magni-Focuser. Speeds precision assemblies, blue print work. Restores the usefulness of the skilled hands of many older workers whose vision needs a seeing aid.

Now aiding thousands of workers, the Magni-Focuser can help your plant produce better. Immediate delivery. 10-day trial without obligation. Return to us if not satisfied. \$10.50.

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Dept. 14, New York 17, N. Y.

piece is desirable to assure maximum bearing surface.

Another design factor is the depth to which the carbide tips are set into the steel shanks. This should be great enough, as shown in sketch, so that the tips can be reconditioned when worn by grinding back on the original angles without reducing the maximum tip diameter.

The same lubricant can be used for carbide tipped centers as for steel centers. White lead is the most common.

Precautions should be taken that the carbide tip is not struck or bumped. When not in use, a carbide center should be kept in the tool rack or in the box in which it came, providing the box is designed to furnish the necessary protection.

To re-finish a carbide tipped center, Carboly Company, Inc. advises, the center can be mounted in the work head of either a cylindrical grinder or a tool and cutter grinder, in the same

manner that steel centers are set up for reconditioning. The carbide center is, then slowly rotated and ground at the same time with a 220 grit diamond wheel. Unless the carbide tip is badly scored or chipped, it should not be necessary to remove more than .002" to .010" of carbide metal. If the work is such that the grind marks must be removed from the lathe center's tip, the carbide can be lapped. After the tip has been ground, its sharp point should be "dubbed off" or broken slightly with either a diamond or a silicon carbide hand hone. The steel portion of the conical tip should be ground with an aluminum oxide wheel.

Re-grinding the tip before it becomes too deeply scored or worn is usually the most economical procedure. If this procedure is followed, the carbide tipped center can be reconditioned many times before replacement becomes necessary.

The End



THE ONLY HEAVY DUTY 15-INCH DRILL PRESSES with $\frac{5}{8}$ - inch Drilling Capacity

BOICE-CRANE

SERIES 2600

* Heavy box-type helmet head. * 50% thicker column. * Guaranteed closer tolerances wherever they count. Much more accurate than ordinary 15-inch drills "built to sell at a price." * 20% larger quill, actually $2\frac{1}{2}$ " dia. * Up to 50% more bearing against side thrust on quill when deep hole drilling and routing. * Rugged steel (not die cast) 6-tooth splined drive sleeve. * Far more sensitive, powerful quill feed. * Quick acting hinged belt guard.

Boice-Crane doesn't try to build the cheapest—but rather the finest intermediate capacity tools at a price only slightly more than that of less accurate, limited capacity, flimsily-built machines.

50 HIGH & SLOW SPEED BENCH & FLOOR MODELS 1 - 2 - 3 - 4 SPINDLES

* 5 speeds—25% greater range. Easy speed changing. * Various options on work tables. * Heads and parts sold separately for special setups. * Full line of accessories, tapping heads and foot feeds.

Boice-Crane also offers a 15-inch light duty drill press line in 12 models at a popular price.



UP PRODUCTION AS MUCH AS 1000%

with the first low-priced, medium size

Combination Contour Saw & Band Filer

Cuts • Files • Grinds



Produces maintenance parts, short run production parts, metal templates, special wrenches, wrench templates, cams, spiral parts, irregular shaped stacked parts, and stamping, forming and trimming dies in minutes instead of the hours required by old methods involving milling, shaping and hand filing. Does precision filing, file broaching and flash removal in one-ninth the time required by hand and one-fourth the time required by reciprocating filing machine.

* Solid welded steel frame. * 15" x 15" ribbed cast work table.

* Improved guide design sharply reduces blade costs. * Handles blades $\frac{3}{8}$ " to $\frac{3}{4}$ " * File bands come in $\frac{1}{4}$ " and $\frac{3}{8}$ " widths, two shapes, six cuts. * 8 speeds, from 92 to 4100 blade f.p.m. Chart, mounted on machine, shows correct speed for accurate inside, outside and contour sawing of all industrial materials.

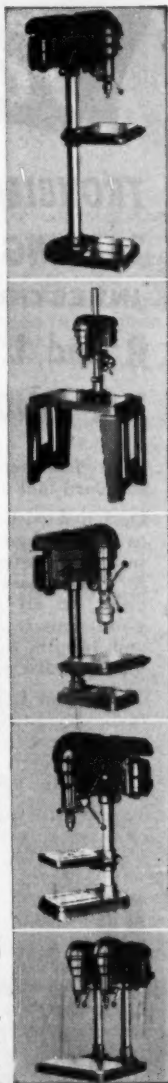
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TROUBLED WITH A TAPPING PROBLEM? INVESTIGATE THE . . . R and L RELEASING TAP AND DIE HOLDER

It is fast becoming accepted as the standard tool of its kind in the industry.

Designed with a positive clutch action as shown, the tool maintains better uniformity between pieces tapped because it will release at the same identical point on all parts. Because of three point contact between the clutch ring and spindle dogs, exceptional wearing qualities are achieved.

The R and L Releasing Tap Holder is easily adjusted for right or left hand tapping and can also be adapted to work on short threads, do bottom tapping or die up to shoulders.

This tool is made in a complete range of sizes from $\frac{5}{8}$ " diameter shank to $1\frac{1}{2}$ " diameter shank.

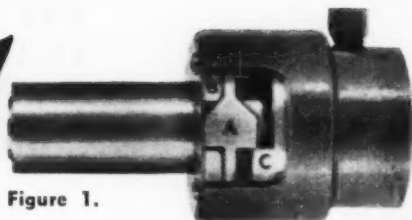


Figure 1.

Ready to start threading operation, clutch slightly engaged at C.

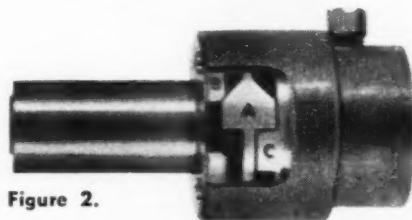


Figure 2.

Instantly engaged to full contact between A and C as soon as tap or die engages work.

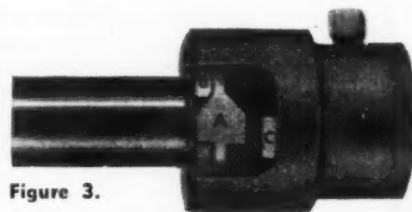


Figure 3.

Fully released showing ample clearance between contact points of clutch preventing reengagement or hammering of clutch points in case turret advances slightly after clutch releases.

R AND L TOOLS

Send for our new 28 page catalog.

1825 BRISTOL ST., PHILA., PA.

TURNING TOOL—UNIVERSAL TOOL POST—FLOATING DRILL HOLDER—CARBIDE AND ROLLER BACKRESTS—REVOLVING STOCK STOP—TAP AND DIE HOLDER—CUT-OFF BLADE HOLDER—TURRET BACKREST HOLDER—RELEASING ACORN DIE HOLDER—KNURLING TOOL—RECESSING TOOL

Tapping of thin-wall parts with 3 drilling and tapping units

An extremely difficult tapping problem was solved by a prominent manufacturer of electrical products. The part is formed steel, brass, or copper, chrome plated electrical fixture. The stock has a thin wall section of .021", making it almost impossible to tap by other automatic machines. Three different diameter parts are tapped: 2½, 3¼", and 4". Three 8-32 pierced holes are tapped automatically in No. 25 USS gauge metal.

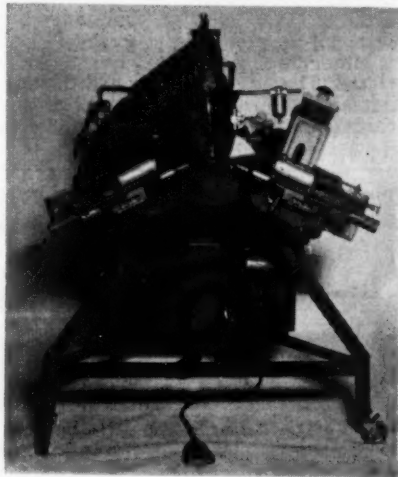
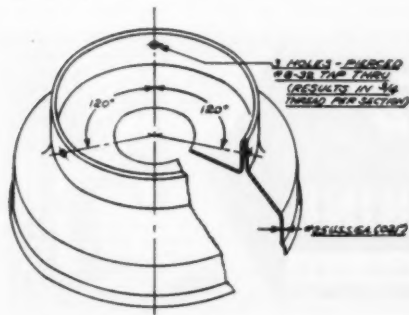
The special machine features three model 350 Hypneumat tapping and drilling units, radially mounted and equally spaced. Operator picks up part from conveyor belt, places it in ma-

chine fixture, and briefly contacts the electric foot pedal. The three units advance, tap holes, and retract after taps leave holes. Work piece is removed and the cycle is repeated. The multiple operation is thus performed in one pass. Controlled automatic power, (air or hydraulic,) assures precise, interchangeable products.

Motors are 440V, 3P, 60C, balance of circuit 220V. Magnetic reversing switches controlled by E-35 stroke con-

The part is in place . . . three heads will tap three holes in the .021" wall of the part. Production is 900 pieces per hour.

Sketch of the electrical fixture . . . Three different diameter parts can be accommodated. Converting from one diameter to another in this tapping set-up is a matter of minutes.



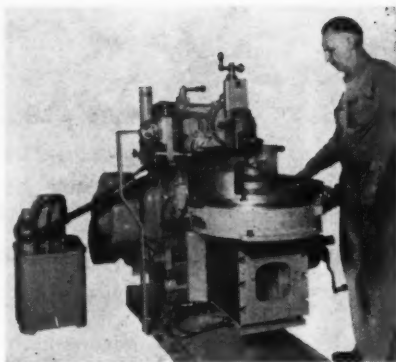
trol assembly mounted to units. Three Hypneumat 5-port double solenoid valves control the stroke on 2 p.s.i. air pressure. Near zero internal Hypneumat friction permits this low pressure operation. Units are made by Hypneumat, Inc., Milwaukee 4, Wis.

The End

Cincinnati shaper duplicating attachment slashes production time

The application of a hydraulic duplicator to a Cincinnati 24" Shaper at a prominent Michigan crane manufacturer has resulted in a big cost reduction in the production of brake mechanisms for overhead cranes. Previously, the parts were produced by shaping and then lapping the surface to a required 50% bearing in a tedious costly operation. By equipping a new Cincinnati 24" Shaper with a Turchan Hydraulic Duplicator and a special rotary table as illustrated in the attached photo, interchangeable mating sections were made in a single operation in a fraction of the time previously required.

The follower equipment consists of a motor and pump, shown on the left of the shaper, a stylus operated hydraulic valve, template, and a hydraulic cylinder attached to the elevating screw. The table feed is automatic and is either horizontal or circular as illustrated. The template operates the stylus and control valve, which in turn causes the table to move up or down as



required. Depth of cut is controlled by the tool slide feed screw.

Hydraulic Duplicators have proven very adaptable to Shapers and present some interesting possibilities. They have proved most useful in those duplicating jobs where a relatively low quantity of parts are required and where the use of form cutters would raise the cost prohibitively. By using the follower in connection with a low cost sheet metal template, very intricate forms can be produced in a short period of time and with inexpensive single point tools.

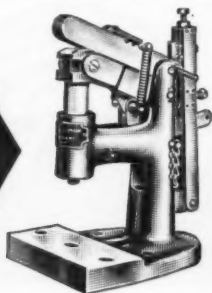
Machining automotive pistons

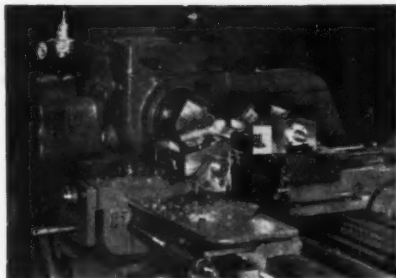
The job was to turn the dome, semi-finish and finish turn the O.D., rough and finish form the ring grooves, chamfer the skirt, chamfer the dome, and chamfer all the ring lands.

The machine used was a Sundstrand

HIGH-SPEED
AUTOMATIC
STAKING MACHINE

HIGH SPEED Hammer Co., Inc. 311 Norton St., Rochester 21, N.Y.





Finishing piston rings . . . on a Sundstrand model 10 automatic lathe with special tooling.

Model 10 Automatic Lathe.

This standard machine, with special tooling produced 150 to 160 pistons per hour.

On the front slide there is a special magazine type block holding semi-finishing and finish turning tool bits plus four rough grooving tools and a tool for chamfering the skirt. The front carriage with a straight feed in, feeds across while semi-finish and finish turning the O.D. When the turning cut is complete, the cam feeds the block straight in for the rough grooving and chamfering operation. On the rear slide, the magazine block holds the finish grooving tools and the tools for chamfering the ring lands. The cam operated block finish turns the dome.



WHO

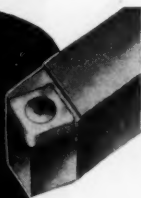
looks more like a busy, little beaver than a wise, old owl these days. But WHO* is still—

Wm. H. Ottemiller Co.
of YORK, PA.

Even though the need for our precision, "milled-from-the-bar" screw machine products has us virtually snowed under—we invite inquiries from those of you who must have "the best."

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for Increased
Productivity



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AUTOMATIC STAKING MACHINE

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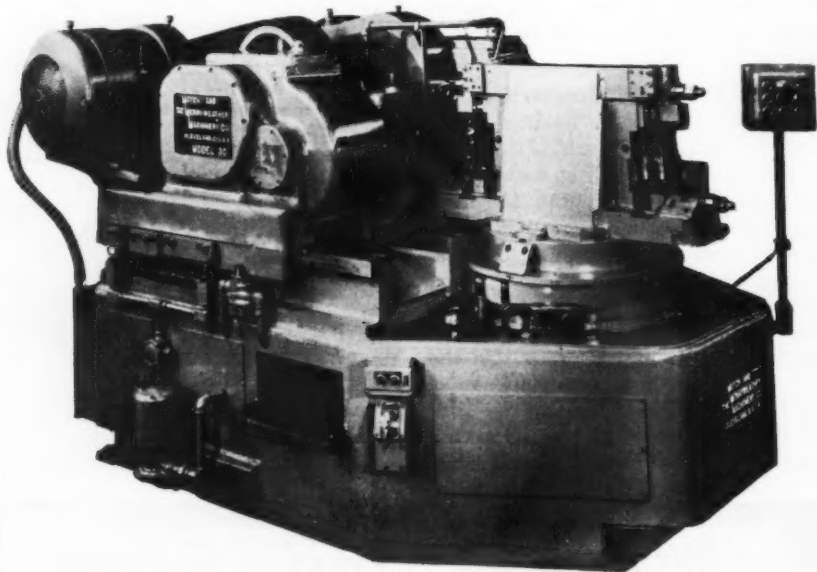
311 Norton St., Rochester 21, N.Y.

Duplex milling of tractor side bars

A duplex milling two-station machine made by Motch & Merryweather Mach. Co., Cleveland 13, O., is machining tractor side bars mounted two in each station. Production is rated at 268 pieces per hour, using carbide tipped cutters. A rotary indexing table carries two sets of work-holding fixtures. While the two milling heads are machining the part held at the work point, the operator is unloading and loading the open fixture. The cycle of operation is automatic when the operator presses the cycle button. The table carrying

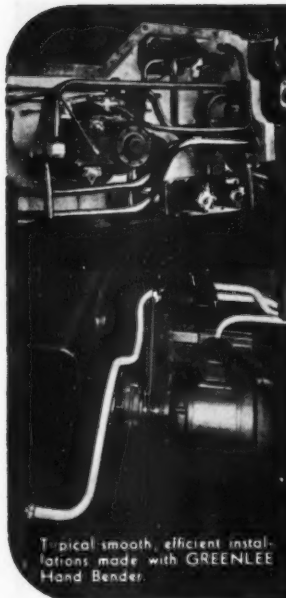
the fixtures and work indexes 180 degrees and is clamped solidly into position. The two opposed milling heads traverse forward, feed to an adjustable stop and rapid traverse return. The heavy duty milling heads can utilize up to 30 HP and have two inches of quill adjustment for cutter wear. Carbide or high speed steel cutters can be used. The milling heads are of the single-speed type; however, speed changes can be made by pick-off gears easily accessible. The movement of the milling heads and indexing of the table are hydraulic. Lubrication of all moving parts is automatic.

Duplex milling machine . . . machining tractor side bars at the rate of 268 pieces per hour at 100% efficiency, using carbide-tipped cutters.



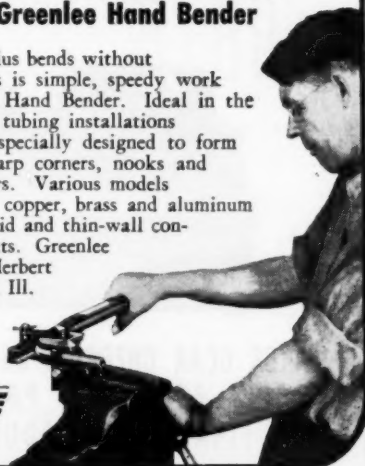
REPRINTS AVAILABLE

Some of the special reports on machine tools which have appeared in the Blue Book during the last year are still available at no charge. Write: Machine and Tool Blue Book, 222 E. Willow, Wheaton, Illinois.



SMOOTH, accurate small-radius bends made quickly in pipe, tubing, conduit with Greenlee Hand Bender

Forming small-radius bends without flattening or kinks is simple, speedy work with a GREENLEE Hand Bender. Ideal in the shop for pipe and tubing installations on machines . . . especially designed to form neat bends for sharp corners, nooks and other close quarters. Various models and sizes for steel, copper, brass and aluminum tubing or pipe, rigid and thin-wall conduit. Write for facts. Greenlee Tool Co., 2009 Herbert Avenue, Rockford, Ill.



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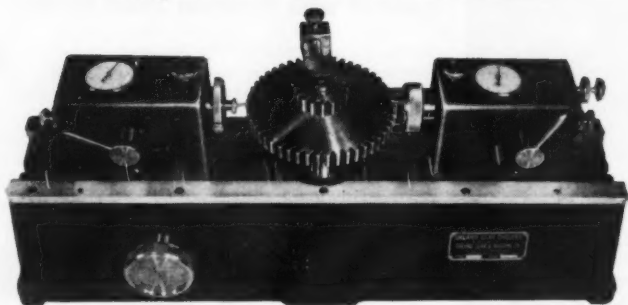
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= lathe values*



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MAKES GEAR CHECKING SO FAST AND INEXPENSIVE YOU CAN USE IT AT EVERY PRODUCTION STAGE, BLANK TO FINAL, AND REDUCE THE COST OF SCRAP!

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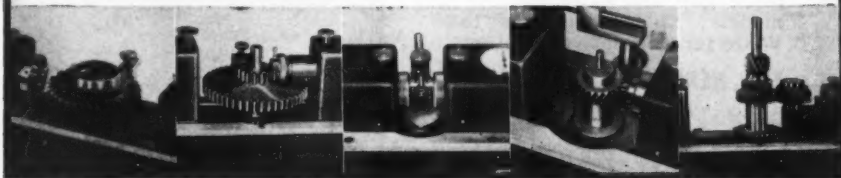
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Catalogs, bulletins available

from manufacturers

. . . books, films

1. **Vapor Degreasing Handbook** answers questions generally asked about vapor degreasing, completely covering the subject of what vapor degreasing is and to what types of materials and manufacturing it can be applied. Photographs of various types of units and data charts are included; 21 pages. **The Phillips Mfg. Co., 3475 W. Touhy Ave., Chicago, Ill.**

2. **Continuing Study of Bearing Maintenance Techniques** and successful maintenance, installation, and removal procedures is being published. This is the first attempt, as far as the Association knows, to publish in permanent form all available maintenance information on every type of bearing. **Anti-Friction Bearing Distributors Association, 1900 Euclid Ave., Cleveland 15, Ohio.**

3. **Shafer Catalog No. 51** illustrates and describes the full line of Shafer products, including Pillow Blocks, Flange Units, Flange Cartridge Units, Cartridge Units, Duplex Units, Take-up Units, Take-up and Frame Units plus unmounted roller bearings. Contains complete engineering and load rating data and illustrates many product applications. **Shafer Bearing Corp., 801 Burlington Ave., Downers Grove, Ill.**

4. **Newly Developed Compact Wet-Blasting Units** with no moving parts, designed for high production rate deburring, descaling, stock removal and general surface finishing, are described in a 4-page illustrated folder available from **The Cro-Plate Co., Inc., Hartford 5, Conn.**

5. **Retaining Rings** to take up end-play and compensate for varying manufacturing tolerances and wear; external type rings applied radially without pliers, and retaining rings that form artificial shoulders for positioning and retaining machine parts on shafts or in housings, are described and illustrated in bulletins Nos. 6, 7, and 8. Specifications are included. **Waldes Kohinoor, Inc., Long Island City 1, N. Y.**

6. **Precision Punch Catalog** illustrates and describes straight-grinding, whip-sleeve, high speed steel, and carbon steel alloy punches. Prices included in this 8-page Catalog No. 514. **Pivot Punch Div., Pivot Punch & Die Corp., North Tonawanda, N. Y.**

7. **Cincinnati Milling General Catalog No. M-1712** has been revised and brought up-to-date. Contains sections on milling, broaching, cutter sharpen-

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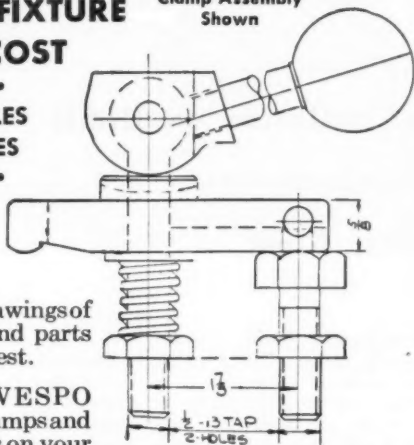
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ing, grinding and flame hardening machines, and cutting fluids, plus information on die sinking attachments, optical projection profile grinding, centerless lapping, and grinding and milling machine attachments. Descriptions, illustrations and specifications are included in this 47-page catalog. Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

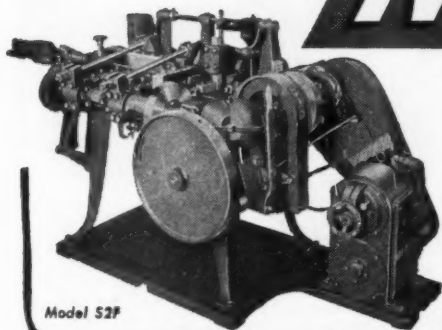
8. Technical Data based on the results of an extensive research program con-

ducted by the Batelle Memorial Institute, Columbus, Ohio, involving all styles and representative sizes of Plate-coils, simplifies the process of selecting and applying industrial heat transfer equipment by supplying charts and formulas to aid in the basic calculations of industrial heating and cooling applications. Manual available from Kold-Hold Mfg. Co., Lansing, Mich.

9. "How Diamond Chain Company Cut Warehousing Costs by Using Heppen-

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stall Tongs", a 4-page folder, including photographs, describes an integrated materials handling system employing specially designed tongs and racks in conjunction with overhead cranes and power trucks. Heppenstall Co., 4620 Hatfield St., Pittsburgh 1, Pa.

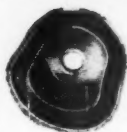
10. The Dodge Double and Single Reduction Torque-Arm Speed Reducer Series are covered in Bulletins Nos. A-470 and A-602. In addition to illustrations, comprehensive data in tabular

form is given to enable the quick selection of the right reducer for any installation. Dodge Mfg. Corp., Mishawaka, Ind.

11. "Presses for Rubber Pad Forming" describes how airframe manufacturers are using the rubber-pad forming technique to produce short-run, wrinkle-free, deep and complex stampings in hydraulic presses; die diagrams of the use of a rubber pad in single-action and double-action presses are given.

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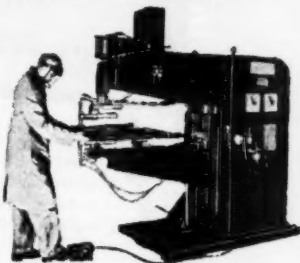
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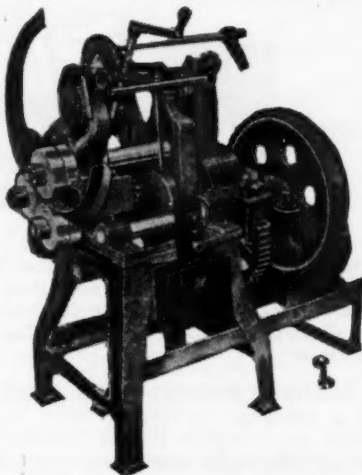
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Examples of various Bliss Hydraulic presses for both shallow and deep-drawn parts production are described and illustrated. **E. W. Bliss Co., Canton, Ohio.**

12. Illustrated Bulletins SC-151, including a hardness conversion table, describes the complete line of "Surface" Standard Rated Furnaces for every tool room heat treat requirement. Emphasizing methods of precise heat treatment for maximum tool life, this bulletin

describes controlled atmosphere furnaces and generators in addition to direct-fired, forced convection and pot furnaces. **Surface Combustion Corp., Toledo 1, Ohio.**

13. 16-Page Bulletin Covering Design Data on Helical-Wire Thread Inserts explains these inserts are used as original manufacturing components to protect tapped threads in aluminum, magnesium, plastics, iron, steel and wood against stripping, wear, corrosion, seiz-

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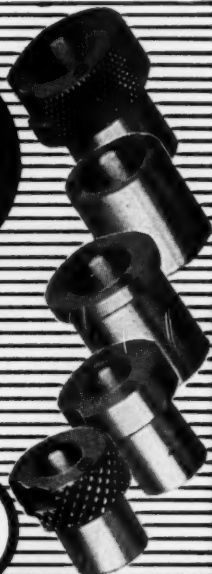
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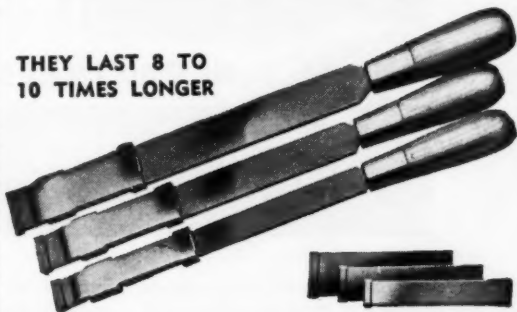


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ing and galling. Tabular data gives basic insert lengths, recommended drill sizes, roughing and finishing-tap specifications, and thread gages to be used when installing thread inserts. Hand and power tools for all levels of production are also described. **Heli-Coil Corp., 47-23 35th St., Long Island City 1, N. Y.**

14. An Entirely New Industrial Line of Single and Multiple Spindle Drill Presses are described and illustrated in Bul-

letin D.P. 51 which includes complete specifications. This bulletin, together with prices and additional information, is available from **Toolcraft Corp., Springfield, Mass.**

15. 99 New and Revised American Standards are listed for the first time in the latest edition of the Price List of American Standards containing standard specifications, methods of test, symbols and abbreviations. Important new standards listed include a

for greater **RIGIDITY**
more **ACCURATE** cuts



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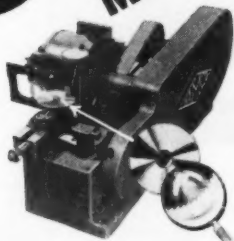
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series on electric discharge lamps, electrical indicating instruments, gas water heaters, grounding-type attachment plug caps and receptacles, and safety requirements for operation of open-surface tanks. This 26-page list may be obtained from the **American Standards Association, 70 E. 45th St., New York 17, N. Y.**

16. Two Types of Townsend Locknuts and Their Advantages are described in a 4-page illustrated folder. The Town-

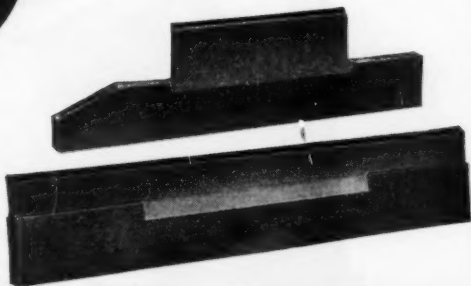
send Nylock Locknut has a tough nylon plug insert in one of the hex faces on the nut midway between top and bottom as its locking element. The Tufflok Nut contains a treated hexagonal fibre washer as the locker medium. Complete description and specifications are listed according to sizes and finishes in tables. Special advantages for aircraft and industrial usage are discussed. **Townsend Co., New Brighton, Pa.**



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for **CENTERLESS GRINDERS**



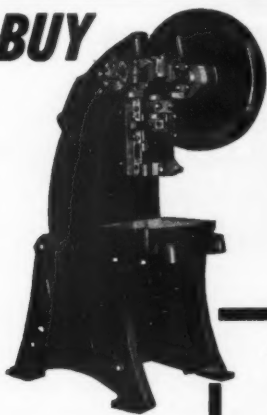
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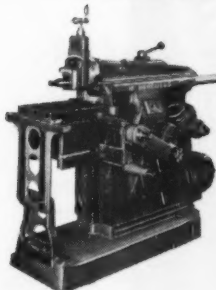
17. "How to Make Your Job Easier with the Amprobe", the pocket-size, snap-on volt ammeter, 16-page manual No. 110, describes the functions of the new tool for anyone who installs, repairs, services or maintains electrical equipment. This tool, one-third the usual weight of such instruments, measures only $7\frac{1}{8} \times 2\frac{9}{16}$ inches. Describes some of the jobs on which this instrument can save time and trouble and also explains the details of how to use it and how to read the scales. Pyramid Instrument

Corp., 49 Howard St., New York 13, N. Y.

18. "Soldering Tips", 20-page pocket manual, covers every important phase of soldering. Time-saving methods, DO's and DON'Ts, fluxes and solder tables, difficult operations—all are discussed in non-technical language. New revised illustrated copies may be obtained by sending 10c in coin to Weller Electric Corp., Easton, Pa.

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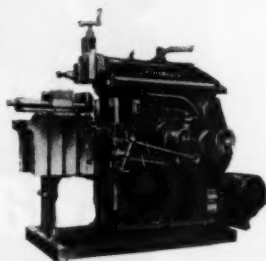
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Universal Table

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19. Annealing Data for the principal analyses of alloy steels is contained in a convenient slide chart. Lists data for producing spheroidal structures in 40 alloy types by both conventional and isotherman annealing processes and data for producing lamellar structures. Republic Steel Corp., 3100 E. 45th St., Cleveland 27, Ohio.

20. "Standards Are Your Business" emphasizes the value of standards of nation-wide scope, rather than company

or industry standards and tells how these national standards mean dollar savings to manufacturer and consumer alike. This 24-page pamphlet is available from the American Standards Association, Inc., 70 E. 45th St., New York 17, N. Y.

21. Power Chucks, Air Cylinders and other equipment are illustrated with cutaway pictures of the various models as well as photos of the equipment at work in this 44-page catalog. American

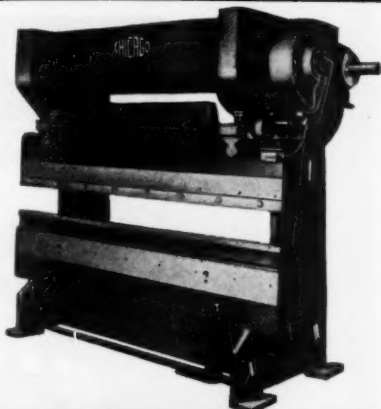


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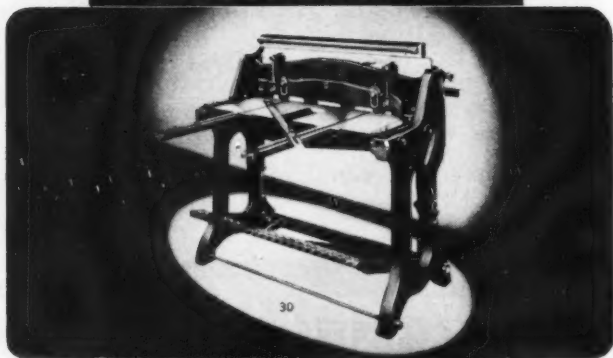
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22. "Fansteel Tungsten Electrodes for Inert Gas Welding", Bulletin 1.102-1, lists standard diameters and lengths in which Fansteel tungsten electrodes are

supplied and contains practical suggestions for longer electrode life, better welds, labor saving and lower welding costs. **Fansteel Metallurgical Corp., N. Chicago, Ill.**

23. "How Wheelabrator Blast Cleaning Solves Acid Pickling Problems" tells in case study form how this airless blasting process has influenced cleaning speeds, costs, safety, etc., and how it eliminates acid disposal in various applications. Illustrated Bulletin No.

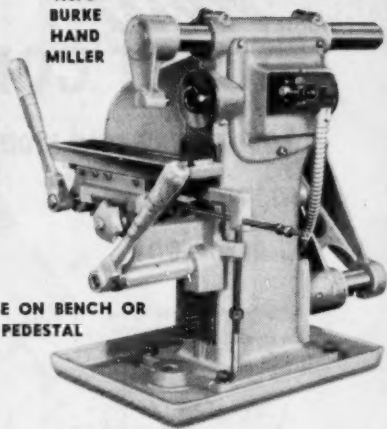
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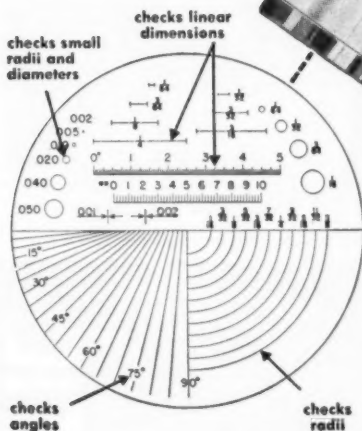
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584A may be obtained from American Wheelabrator and Equipment Corp., 750 S. Byrkit St., Mishawaka, Ind.

24. General Catalog of Boots Self-Locking Nuts covers hexagon nuts, anchor nuts, floating anchor and channel assemblies. Complete data is given on all items in the Boots line: sizes, dimensions, materials, heat ranges, types of anchor bases, etc. 23-pages with illustrations, this catalog is avail-

able from Boots Aircraft Nut Corp., Stamford, Conn.

25. Various Types of Northern Hi-Life Hoists and Hoist Cranes are described in an 8-page, illustrated, Booklet E-312. Close-up and sub-assembly views show details of design and construction. Tabulated dimension data for different capacities and spans for hoist cranes and end trucks is included, with typical installation views. **Northern Engrg. Works, Chene at Atwater, Detroit, Mich.**

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26. Tool-Line Bench and Pedestal Grinders and Grinder Buffers are described and illustrated in bulletins 1010, 1020, and 1030. Complete descriptions and information on performance, construction, and accessories are given. Brown-Brockmeyer Co., Dayton 1, O.

27. "3M Adhesives, Coatings and Sealers" tabulates the properties of over 100 industrial adhesives, coatings and sealers, and offers research help for industrial customers in selecting the

right product for the job; 32-pages with illustrations. In addition, separate 2-page section of the catalog describes specialized adhesives, coatings and sealers for the shipbuilding industry, for the construction trades, and for the oil industry. Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.

28. Detailed Information on Titeflex Filters, including sizes, capacities and motors, as well as descriptions of the

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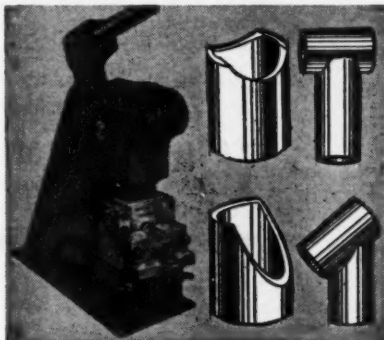
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various metals from which filters are constructed, is given in this 8-page booklet. It illustrates and describes the complete operating cycle of Titeflex filters including the unique backwash system which permits cleaning in minutes without the use of manual labor. Titeflex, Inc., 500 Frelinghuysen Ave., Newark 5, N. J.

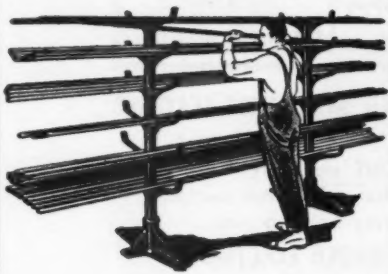
29. Hardfacing Catalog contains detailed information on the complete Airco line of hard-facing alloys. Des-

cription of product, typical uses, mechanical properties, chemical analyses and a brief outline of recommended procedures are included in this 20-page illustrated catalog. This data is further supplemented by allied information such as a tabulation of recommended grinding wheels for dressing deposits of Airco hardfacing alloys. Air Reduction Sales Co., Div. of Reduction Co., Inc., 60 E. 42nd St., New York 17, N. Y.

30. Illustrated 4-page bulletin No. 105,

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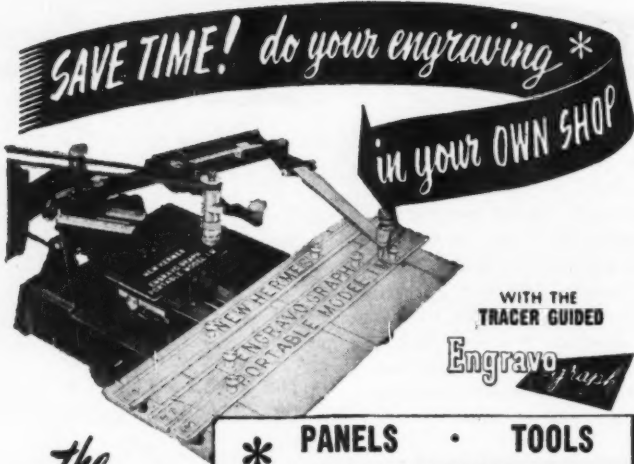
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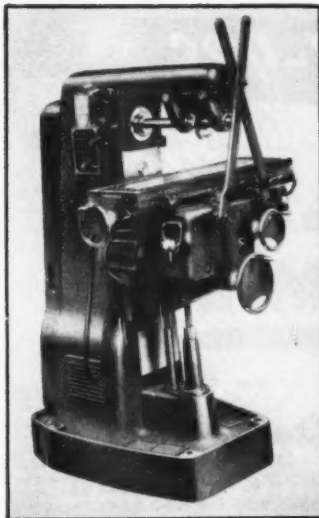
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sheets. Forker Corp., 2944 Random Rd., Cleveland 6, Ohio.

31. **The Cleveland Crane Graphic**, Vol. 7, No. 2, features an article telling how a structural shop cut the man-hours required for various jobs by an average of 40% because of the installation of Cleveland Tramrail overhead handling equipment. Other articles describe the Cleveland Tramrail automatic dispatch system, the new protected conductor bar system, the use of the Cleveland



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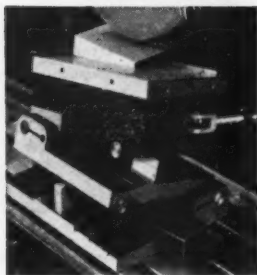
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Tramrail roll handling system in a newspaper warehouse, and several Steelweld machines. This 8-page illustrated monthly publication may be had by writing the Cleveland Crane & Engrg. Co., 1010 E. 289th St., Wickliffe, Ohio.

32. Marking Devices Catalog lists steel and brass stamps and dies, roller and embossing dies, steel type and type holders, machine engraving, dies, molds, plates, burning brands, steel letters and

figures, metal checks and nameplates, and rubber stamps. 20 pages with illustrations, it also includes style charts for rubber and steel stamps. Available from Merkert & Sons, 146-10 Jamaica Ave., Jamaica 2, N. Y.

33. Vitrified and resinoid bonded wheels. This 108-page catalog is arranged in three sections, dealing with various aspects of grinding wheels. The first 32 pages describe the precision manufacture of the company's grinding

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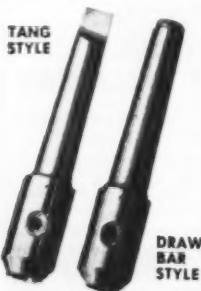
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wheels, through every step. Operations performed by Peninsular wheels, including cylindrical, roll, centerless, surface, tool and cutter, and internal grinding are next described. Balance of catalog contains indexes to the wide variety of types of vitrified and silicate grinding wheels, with complete specifications, followed by similar descriptions devoted to resinoid grinding wheels and segments for chucks. Catalog contains much factual information of definite value to grinding wheel maintenance and set-up men. Write for a copy to: Peninsular Grinding Wheel Co., 720 Meldrum Ave., Detroit 7, Mich.

New Technical Books

The aluminum data book

Published by Reynolds Metals Co., Louisville, Ky. 1950, 194 pages.

This handy pocket-size manual contains 117 tables of data on physical, chemical, and mechanical properties; standard tolerances; weights; standard sizes and production limits; as well as much fabricating data. Included are tables showing relative corrosion resistance, the action of many chemicals on aluminum, elevated and low-temperature properties, fatigue strengths, minimum bend radii, joining methods, finishes for aluminum.

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It will be sent without charge to engineers, designers, and technical men who request it on company letterhead. Address Reynolds Metals Co., 2500 S. Third St., Louisville, Ky.

Die casting

By H. H. Doehler. Published by McGraw-Hill Book Co., Inc., New York, N. Y. \$8.00.

Mr. Doehler, who founded the Doehler-Jarvis Corp. and designed the first practical die casting machine, provides in this volume an authentic and

thorough analysis and survey of the entire die casting process.

In addition to presenting a clear picture of the unlimited possibilities of die casting as a fabricating technique, it also discusses the production, engineering, design and materials of die casting, and points out probable trends and developments.

This book supplies production data on hydrauliscope analysis of injection processes, automatic ladling, die selection and die manufacturing, and other phases of die casting. It describes common practices for machining and hobbing dies, methods of metallurgical control of die steels, and the heat treatment of dies. Practical data on the cause and cure of erosion, heat check, cracking, and wear of die steels is also provided.

How to run a lathe

Published by the South Bend Lathe Works, South Bend 22, Indiana. 50th edition, 128 pages. Paper binding—25c; imitation leather fabrikoid binding—\$1.00.

In this latest edition the eleven chapters are clearly written in nontechnical language making it easy for the beginner to understand. The text covers such items as the correct installation and leveling of the lathe, grinding cutter bits, turning, boring, thread cutting, taper turning, drilling, reaming, tapping, machinability ratings and cutting speeds for various kinds of steels; standard tolerances for press fits, running fits, push fits, and sliding fits; allowances for finish turning, filing, polishing, grinding, reaming, lapping and honing; and tooling dimensions for South Bend Lathes.

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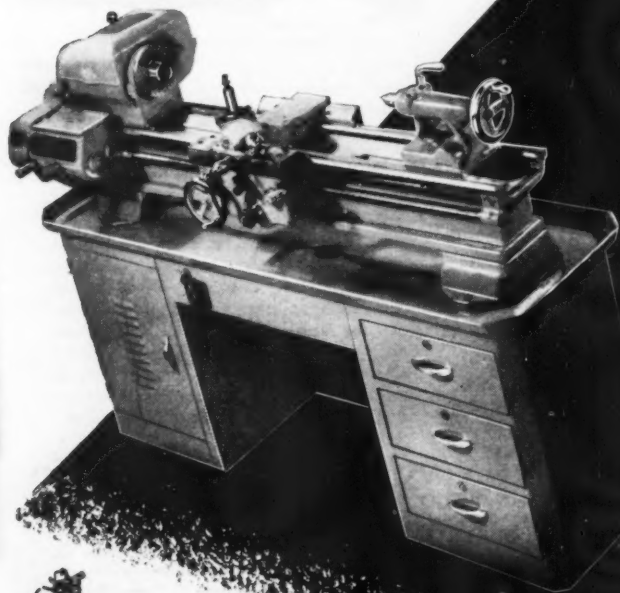
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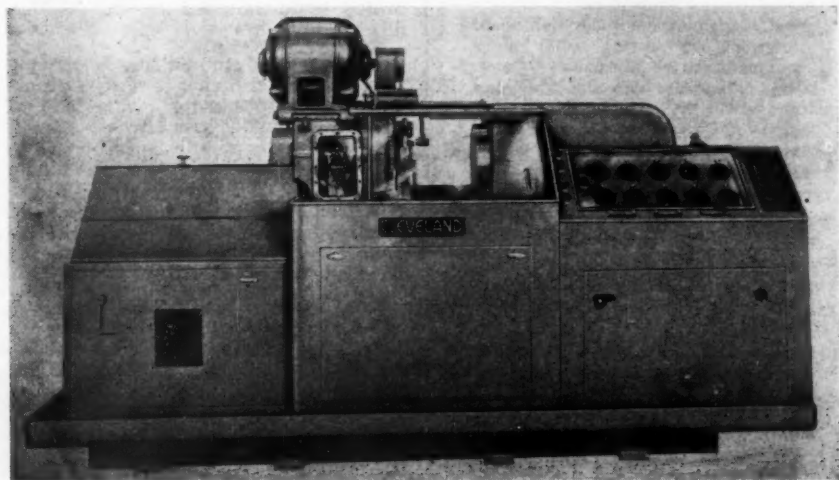
Cleveland model "AB" Dialmatic redesigned

Engineers at Cleveland Automatic Machine Co., Cincinnati 12, Ohio, have recently redesigned the Model "AB" Cleveland Dialmatic by adding new features which further improve the flexibility and performance of this single spindle automatic unit.

The substitution of a dynamic coupling and a conventional feed motor has been made for the motor generator set

and a d-c motor in the electric feed drive. This drive, which controls turret feeds without making cam changes, now consists of a control panel with ten dialed rheostats, a feed calculation chart, a 3 h.p. feed motor, dynamic coupling, rotary selector switch, shifting disc and shifting mechanism. With the spindle speeds set and the feed for each turret tool position determined, dial

Cleveland Dialmatic, Model "AB" . . . now equipped with a dynamic coupling and standard feed motor, controlling the turret feeds without making cam changes. A total of 112 spindle speeds, from 24 to 1820 r.p.m. are provided; four automatic spindle speed changes, both forward and reverse, are available for each set of change gears.





Allison COLLET CHUCK



**NO STOPPING
NO KEYS
NO WRENCHES
NO PRODUCTION
DELAYS**

Meet sudden demands for high speed production by having every lathe equipped with the Allison Collet Chuck. Gives full spindle bore capacity to any lathe having $1\frac{1}{2}$ "-9 thread spindles. Requires no keys, wrenches, reverse switching or stopping. Operator simply draws lever ball toward him to tighten collet; pushes it away from him to release. Mail the coupon for complete, illustrated description and prices.

ALLISON CHUCK PRODUCTS
2003 South Mesa Street
San Pedro, California

Please send catalog page, prices and name of nearest supply house.

NAME _____

ADDRESS _____

CITY _____ STATE _____

settings for each rheostat can be established quickly by referring to the feed calculation chart at the right hand side of the control panel.

The conventional 3 h.p. a-c feed motor drives the outer, or field member, of the induction current variable feed coupling through a rope drive. This motor also drives the idle motion or rapid traverse of the machine. The speed of the inner, or driven member of the coupling, is controlled by the rheostat settings mentioned above, and a rotary selector switch, driven by the camshaft, selects the proper rheostat for each turret position. Thus, separate, infinitely adjustable feeds can be pre-selected for both forward and return motion of each of the five turret positions, and the feed rate for any turret tool can be changed while it is cutting, making it possible to tune the job to maximum production.

The feed drive mechanism has been simplified, and a newly designed sheet metal guard, provides easy access to this drive for maintenance purposes. The disc type friction clutch, which controls the feed and rapid traverse of the machine, is shifted automatically by a small hydraulic cylinder. This cylinder is controlled by a solenoid valve which is actuated by a set of micro limit switches tripped by adjustable dogs on the shifting disc. These dogs can be easily pre-set to a calibrated scale mounted on the shifting disc.

There are 112 spindle speeds, ranging from 24 to 1820 r.p.m., providing efficient cutting speeds for every kind of metal and for all types of cutting tools. Four automatic spindle speed changes, both forward and reverse, are available for each set of change gears. The disc type friction clutch in the spindle head is shifted automatically by small hydraulic cylinder in the same manner as the feed bracket clutch.

The Cleveland Model "AB" Dialmatic is built in both a $2\frac{1}{2}$ " and 3" capacity bar machine. However, a simple chucking attachment can be substituted for the bar stock feed assembly to convert either of these machines to chucking machines.

EVEREDE

**BORING BAR
TOOL HOLDERS**

speed up Precision boring BECAUSE . . .

GREATER . . .

- UTILITY
- FLEXIBILITY
- VERSATILITY



ON BENCH LATHES & ENGINE LATHES
ADJUSTABLE to various type and sizes of LATHES
 . . . made possible by EveredE adjustment of center-height of boring bars. Makes these holders step up precision boring production at important savings in expanded capacity, wider use of critical existing equipment and man-power. That's why EveredE Boring Bar Holders are gaining evermore prominence in leading production plants. Start getting EveredE benefits today . . . send for complete details.



1 NO. 1 BENCH LATHE TOOL HOLDER: Fits lathes from 7 through 9 in. swing. Uses bars with $\frac{3}{8}$ " shanks. Used exclusively on precision bench lathes.



2 NO. 2 ENGINE LATHE TOOL HOLDER: Fits engine lathes from 8 through 12 in. swing. Max. bar Cap. $\frac{3}{4}$ " diam. Height of holder, lowest, 1-1/16"; highest, 1 3/4".



3 NO. 3 ENGINE LATHE TOOL HOLDER: Fits lathes from 12 through 24 in. Max. bar Cap., 1" diam. Height of holder, lowest, 1 1/2"; highest, 2 3/4".

(NOTE: "Height of Holder" is distance from bottom of holder to center of lathe.)

LARGER BARRELS: furnished for No. 3 Holder accommodating bar sizes from 1 1/8" through 1 1/2".

- ★ **EVER-HORIZONTAL POSITIONING.** Regardless of lathe size. (Within negligible limits.)
- ★ **EVER-RIGID and DURABLE . . .** Made of case-hardened alloy steel.
- ★ **EVER-HANDY TOOL POST BLOCK . . .** secured by chain to holder.

EVEREDE Tool Co.

 2000 North Parkside Avenue
 Chicago 39, Illinois

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KIPP AIR GRINDERS
Because

The RPM's stay up while grinding . . . not only when the grinder runs idle.

It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind — not just rub. The speed of Kipp air grinders drops but slightly when put to work. That means better work—longer wheel life.

Buy Kipp air tools for best results, lower prices.

MODEL JA
50,000 R. P. M.

\$42⁰⁰

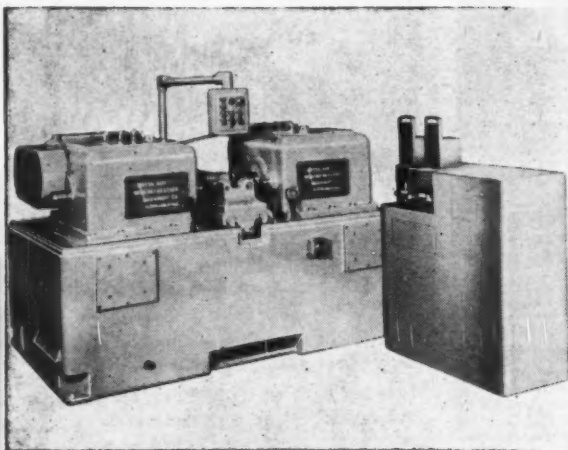
IN U. S. A.



Weight 12 ounces;
 length 6 3/4 inches;
 chuck size 1/8 inch.
 Wheel guard removed for better illustration.

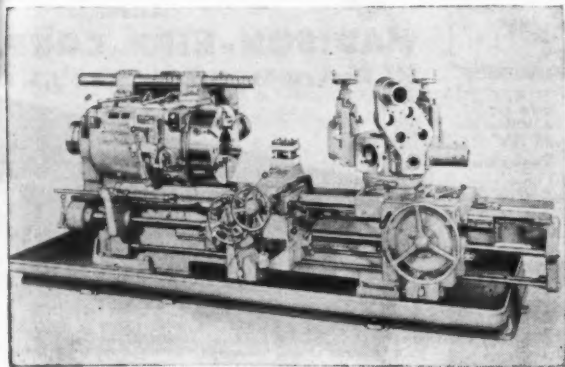
MADISON-KIPP CORP.
 207 Waubesa St., Madison, Wis., U. S. A.

- Skilled in DIE CASTING Mechanics
- Experienced in LUBRICATION Engineering
- Originators of Really High Speed AIR TOOLS



Motch & Merryweather milling machine . . . for machining automotive connecting rods. The unit removes the correct, amount of metal from each end of the part to effect a weight balance of within two grams. The auxiliary Toledo Scale Unit, is shown, at the right, placed at a 90° angle to the large machine. Production rate 240 pieces per hour.

Warner & Swasey Model 4A turret lathe . . . features a new hydraulic forward and reverse clutch incorporated with a hydraulic brake, both mounted in the machine's headstock. Fast starts, stops and reversals of heavily weighted spindles are thereby permitted.



Special purpose milling machine

Manufacture of interchangeable automotive connecting rods entails a final operation of machining each end to weight balance within two grams. The Motch & Merryweather Machinery Company, 715 Penton Bldg., Cleveland 13, Ohio has produced a machine for this purpose with the cooperation of the Toledo Scale Company, Toledo, Ohio.

The machining unit consists of two opposed special quill type stationary milling heads and a hydraulically actuated clamping fixture, mounted on hardened ways between the two heads, with all units mounted on a heavy, normalized, welded steel base. The Toledo Scale Unit is contained in a floor-mounted cabinet, positioned at right angles to the machine, within easy reach of the operator.

To start the cycle, the operator places an overweight connecting rod on the scale unit where each end is individually weighed about the fixed center of gravity and the amount of overweight mechanically transmitted to the machining unit. The connecting rod is then placed in the fixture of the milling machine and the cycle button pressed.

The locating probes and quills of both milling heads advance with the locating probes stopping against the work with the milling head quills advancing

the additional amount necessary to remove a sufficient amount of metal from each end to bring the connecting rod within weight balance. At this point the milling head quills are locked, and the fixture slide is rapid traversed to the milling cutter and then fed at milling rate until the face milling cutters have removed the extra stock. At this point the milling quill and probes retract and the fixture returns to the starting position and unclamps.

During the machining cycle, the operator places the next overweight rod on the scale unit, the correct data is transmitted from the scale unit to the milling head, where positive mechanical stops are positioned and held until the operator unloads the completed rod and reloads the overweight rod into the fixture and presses the cycle button.

The production rate is 240 pieces per hour, with the cycle of the machine arranged to accommodate a higher rate of production, dependent upon the skill of the operator in handling the work.

W & S 4A turret lathe

A new model 4A heavy duty saddle type turret lathe featuring important design changes is announced by The Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, Ohio.

A new hydraulically actuated forward and reverse clutch in combination with a disc-type hydraulic brake has been incorporated in the headstock, providing for faster, smoother, handling of the eight 12" bars accommodated by this size machine. The clutch and brake mechanism is controlled by a "forward-reverse-brake" lever which eliminates the neutral or intermediate delay position previously used. The new design permits fast starts, stops and reversals of heavily weighted spindles.

The rapid traverse shaft has been moved to the front of the machine, and rapid traverse is now provided to the cross slide, with a single lever to control rapid traverse motion in four directions.

Power for the rapid traverse drive is now supplied by a separate 3 h.p. motor mounted in back of the headstock. The same auxiliary motor also drives the

NOW there are **THREE** in the **WALTON FAMILY**



The Walton Company has added Walton-American Tool Holders to its line of time- and labor-saving tools — the well known Walton Tap Extractor and its companion Reps Pipe and Stud Extractor.



WALTON TAP EXTRACTORS

Universally used for removing stubborn, balky taps that break off deep in threaded work. Quick, easy, inexpensive. Will not damage threads.

WALTON-AMERICAN TOOL HOLDERS

Many holders in one. Head will swivel around an entire circle. May be set for straight, right or left-hand offset positions. Will hold with perfect grip any size square or round tool bit or boring bar.



REPS PIPE AND STUD EXTRACTORS

When faced with broken pipes or studs that defy movement—here's the tool. Makes a strong, four-point grip without need for hammering or pounding. Hardened steel—will remove any material.

SEND FOR NEW CATALOG
OF WALTON TOOLS

THE WALTON COMPANY
Dept. 12, Hartford 10, Conn.

Please send your new catalog of Walton Tools with full details of free trial offer.

Name
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★ THE ★ WONDER CUTTER

The lowest -
priced wire and
rod cutter on
the market. The
hardened cutters
last indefi-
nitely.

Hand operated. A giant for work, cuts
wire and rods up to $\frac{3}{8}$ -in. round or
 $\frac{3}{8}$ -in. square and band iron up to $\frac{1}{2}$ -in.
by 2-in. Adjustable stop for repeated
cuts to same length. Large or small,
your shop can use a WONDER CUTTER.

Write today for prices.

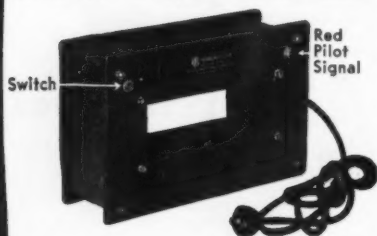
THE FEDERAL FOUNDRY SUPPLY CO.

4602 East 71st St.,

Cleveland 5, Ohio



AMC Quick DEMAGNETIZER



A necessity where machine tools
are used.

Standard units available.

Write today for descriptive circular.

ALOFS MFG. CO.

1629 Madison, Grand Rapids, Mich.

coolant, hydraulic and lubricating
pumps. The effect of a separate power
source for these auxiliary functions is
to permit great flexibility in the selec-
tion and application of the main drive
motor.

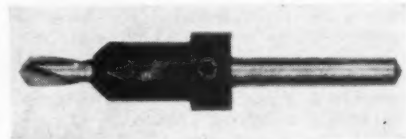
Pressure in the lubricating system has
been increased, and a new-type high
pressure gear pump has been applied to
the unit. The hexagon turret stop roll
design has also been improved for
easier adjustment and long life.

Bar feed attachment for the new 4A
models is now hydraulically operated,
utilizing the same stand and feed head
as previously used in the manually
operated model, but substituting ef-
fortless hydraulic actuation through a
control lever mounted atop the carriage
stop rod bracket.

All standard tools will continue to
be applicable to the new model, and, in
addition, the heavy duty stationary
overhead pilot bar will now be avail-
able for the 4A-1550 (12" bar capacity)
machine.

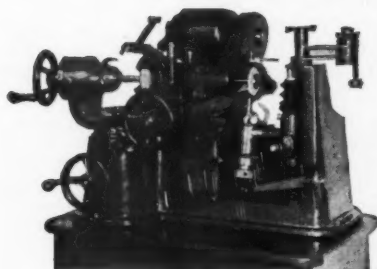
High speed steel countersinks

A new series of sixteen high speed
steel metal-cutting countersinks has re-
cently been announced by W. L. Fuller
Co., 1165 Warwick Ave., Providence,
R.I. These countersinks, of four-blade,
rugged construction, mount on twist
drills. They are adjustable either up or
down on the drill, and are fastened with
two socket head set screws which fit
into the groove of the drill.



The Fuller countersinks are made in
sizes for No. 3 to No. 18 wood screws;
countersink diameters range from $\frac{1}{4}$ "
up to $\frac{5}{8}$ ", to fit drill holes of from $\frac{3}{32}$ "
up to $\frac{5}{16}$ ", mostly in increments of
 $\frac{1}{64}$ ". The twist drill cuts for the body
of the crew, and the countersink cuts
a bevel to accommodate the bevel under
the head of the screw.

HYBCO TAP GRINDER



MODEL 1100

**CHAMFER
Sharpening**



**FLUTE
Sharpening**



**GUN POINT
Sharpening**

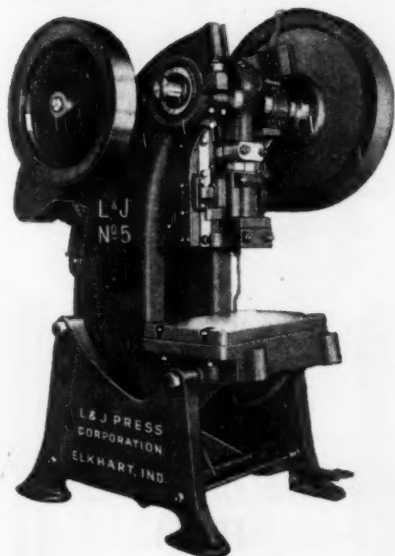


• Capacities No. 0 Machine Screw to
1½" Hand Taps.

HENRY P. BOGGIS & CO.
710 East 163rd Street
Cleveland 10, Ohio

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Rigid — Dependable



The rigid accuracy of L & J Presses gives you better work — closer tolerances and better finishes — with a minimum of maintenance. It is the result of their heavy construction, advanced design and skilled workmanship. This dependability can mean lower production costs for you.

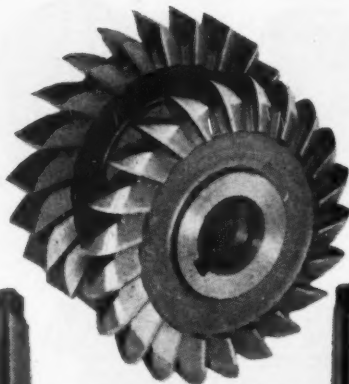
*Write for literature
12 models — 6 to 80 tons*

L&J PRESS CORP.

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ELKHART, INDIANA



RUTLAND



SAVE TIME - SAVE MONEY
SAVE TOOLS
For rapid changeover of Tool
setups

SPECIAL TOOLS FROM STANDARD TOOLS

All types of special reamers, cutters, end mills and drills can be made from standard catalog tools. We can make these specials to your blue prints quickly and economically from our large stock of standard cutting tools.

Mail your specifications or blueprints today for immediate price and delivery.

Rutland TOOL SERVICE

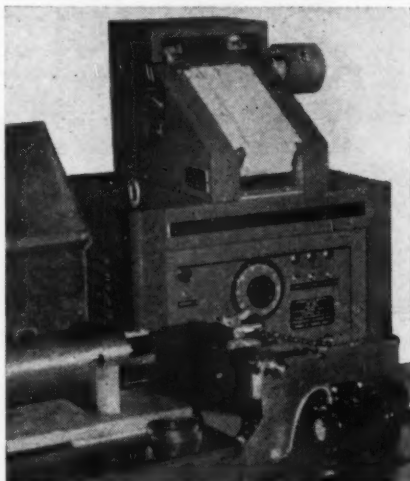
1617 E. McNICHOLS • DETROIT 3, MICH.

TW inbrook 3-6240

Automatic crack detector

An ingenious new automatic crack detector, for ferrous metal tubes designated as A.C.D.T., has been introduced by Graydon Smith Products Corp., 150 Causeway St., Boston 14, Mass.

The function of A.C.D.T. is to detect and record pictorially cracks and crack-shaped flaws in ferromagnetic tubular products. The inspection device travels



through the bore the tubes, detecting and recording both surface and sub-surface flaws, cracks, seams, flakes, inclusions and other discontinuities of a crack-like nature.

The operation of the A.C.D.T. is, as follows: The inspector inserts the inspection head into the magnetized tube to be inspected. Moving to the recording cabinet, he closes a switch which starts the head through the tube. Standing in front of the recorder, he examines the facsimile paper chart emerging at a rate proportional to the travel of the head through the bore. What he sees is equivalent to a scale photograph of the developed bore surface with cracks standing out clearly. Sensitivity is adjustable to eliminate negligible flaws on the record.

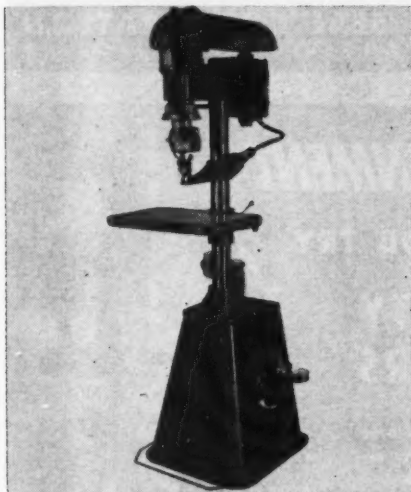
As with other magnetic test methods, laminar type flaws such as cold shuts

in castings, laps, blisters and folds if predominantly oriented in a plane parallel to the surface being inspected, fail to generate a recordable signal.

Etico-Emrick tapping machine

The Etico Tool Co., Inc., 596 Johnson Ave., Brooklyn 6, N.Y., announces a new, High Speed-Sensitive Tapping Machine that can be operated by using either foot or air pressure. The machine is built for the use of either single spindle tapping units or multiple heads, with provision for quick changeover from one production job to another.

No skill or delicate touch is required by the operator. The tapping action is controlled through an adjustable pull spring inside the centerless ground column. Whenever the foot treadle is pressed down by foot or air, this spring feeds the tap into the work and gives automatic protection against tap breakage or faulty threads.



Two oil tanks are built in the machine; one cast in the head using gravity feed for light lubrication, the other in the base for use with oil pump when a steady flow of oil is required. A built-in stripper plate permits the use of simple work holders and is used to strip part from tap. It also holds lubrication tube and brush.

September, 1951

SAVING **FINISHING**

GROB
BROTHERS
GRAFTON WISCONSIN

TOOL HOLDER INDEXING HEADS



Holds 1/16" up to 1 1/2" Tools
SC or IAM Collets and Brown & Sharpe or Morse Taper. Will adjust to any compound angle.

GRINDERS & FIXTURES INC.
8327 Clinton Road Cleveland 9, Ohio



*Makes SHORT WORK
of SMALL PARTS!*

LOW COST, PRECISION

GLOBE

HAND SCREW MACHINE

10" SWING, 1" COLLET CAPACITY

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Heavy Duty Lathe Production Cross Slides,
Bed Turrets, Pedestal Grinders & Buffers,
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GLOBE PRODUCTS-HEAT SEAL CORPORATION
3381 ROBERTSON BLVD., LOS ANGELES 34, CALIFORNIA

FOR PERFECT ALIGNMENT

ON THE HEAVIEST JOB TRY

**ROOFE HEAVY-DUTY
BULL NOSE CENTERS**

Two double rows of quality bearings in the large
and small ends of the nose of this live center as-
sure perfect alignment with any type of work.

Two shank sizes provide diameters from $\frac{1}{8}$ " to $7\frac{1}{8}$ "
for a wide range of work with a single center.

Write now for
complete
catalog of all
types of
ROOFE
Live Centers



HOUSTON GRINDING & MFG. CO., INC.

2110 QUITMAN STREET — HOUSTON 10, TEXAS.

Reliable Distributors Wanted

**HOLD THE
TRUCK!**

**I JUST FINISHED
THE HARDNESS TEST
ON THE LAST
BUSHING IN THIS
SHIPMENT**

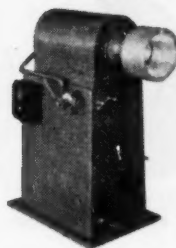


**EACH AND EVERY
UNIVERSAL
DRILL BUSHING
IS TESTED FOR HARDNESS
which assures longer
bushing life**

UNIVERSAL 141-B
ENGINEERING COMPANY
FRANKENMUTH 10, MICHIGAN

SCHAUER

SPEED LATHES

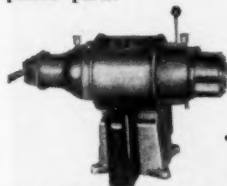
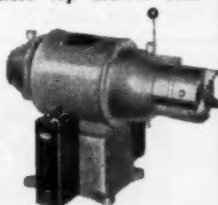


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Uses Them?**

General Electric • Aluminum Co. of America • Studebaker • Thos. A. Edison • Ford Motor • Westinghouse Electric • Owens Illinois Glass • Lockheed Aircraft • Western Gear Works • Bryant Electric • Royal Typewriter • Yale & Towne • Eastern Airlines • Minneapolis Honeywell • Remington Arms • American Locomotive • American Brass . . . and several hundred more top drawer companies!

Why?

Because Schauer Speed Lathes cut from 30% to 90% off the cost of polishing, filing, lapping or de-burring small metal and plastic parts!



- Chuck, collet or vacuum holding fixtures.
- Single speed, two-speed or variable speed models.
- **SAVE WITH SCHAUER!** Write for Bulletin 500.

SCHAUER MANUFACTURING CORP.

Originators of Today's Speed Lathes
2064 Reading Rd., Cincinnati 2, Ohio

SOMETHING NEW UNDER THE SUN



Finished holes $1\frac{1}{2}$ " to $11\frac{1}{4}$ " diameter to a depth of 8" in one rapid operation on your present equipment

with

THE BOREMASTER

Not just another Trepanning Cutter but a real heavy duty tool. Stock removed in one piece eliminating waste.

TIME SAVINGS + MATERIAL SAVINGS

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MARVECO *Live Centers*



- HEAVY DUTY
- LONG LIFE
- HIGH SPEED

MARVECO is the time-tested live center with unlimited capacity—50 pounds to 50 tons... guaranteed to outperform and outlast any other live center. You can depend on MARVECO for trouble-free production.

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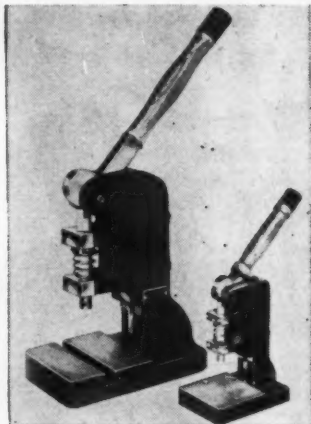
SEND US YOUR CENTER PROBLEMS

MARVEL TOOL & MACHINE CO.

1096 North River Road • St. Clair, Michigan

Bradley hand operated presses

I. H. Bradley & Sons, 264 Fifth St., Bridgeport, Conn., manufacturers of wood turning and sawing machinery, announce the acquisition and production of the Boering Tool line, consisting of a group of hand and foot operated presses to speed assembly in light manufacturing, particularly in the electrical devices, parts, instruments, radio, electronics, hardware, and other industries.



These presses are especially needed today, as they take the place of power-driven presses for light assembly work. They meet the needs of numerous operations now being performed on equipment many times their cost.

Two hand presses sizes are available. The larger, weighing 22 lbs., exerting a force of 1,250 lbs., on the part being assembled, has an adjustment of $1\frac{1}{2}$ " in overall height and a stroke of $\frac{1}{8}$ " permitting a flexible adjustment. All parts are precision machined and the weighted hardwood handle adds force to the pressing operation. A coil spring of high tensile strength aids the quick return of the lever. A T-slot in the $5'' \times 5''$ base allows for easy insertion of tools or fixtures. The press may be easily fixed to a bench or table.

Featuring the same basic construction as the larger press, but designed for lighter assembly or riveting operations,



NEW Beverly SLITTING SHEAR

MORE POWER . . . Easier Cutting
EXCLUSIVE DESIGN . . . Cleaner Cuts
RUGGEDLY BUILT . . . Last a lifetime
CAPACITIES TO 3/16"

Get faster, easier slitting and trimming with a new design Beverly "SS"-Series Slitting Shear. Rigid, strongly braced frame; compounded linkage and extra strength where needed. Many exclusive features. Write for FREE illustrated Bulletin.

See your Beverly Distributor today.
Ask for a demonstration—no obligation.

SS-3 3/16" slitting cap;
5/16" trimming; 1/4"x2"
bar capacity.

Beverly **SHEAR MFG. CO.**

3005 W. 111th STREET • CHICAGO 43, ILLINOIS



Economy's CLOSE-TOLERANCE DRILL-JIG BUSHINGS AND GAGES MEET YOUR HIGHEST STANDARDS

All A. S. A. standard types and sizes are in stock, ready to fill your order. And if you need new gages or gages salvaged by hard chromium plating, you can also depend on fast delivery. Write for bulletin and price list.

Economy TOOL & MACHINE CO.

1829 SOUTH 68th STREET • MILWAUKEE 14, WISCONSIN

the junior size weighs only 6½ lbs. has a ½" stroke and 1" adjustment. Both units can be modified for foot pedal operation.

General purpose electronic counters

The Post Machinery Co., a subsidiary of Reid Bros., Beverly, Mass., in collaboration with the General Control Co., have adapted their Counter for general-



purpose counting in several variations, including total count, rate of count, and pre-determined count. A contract has been effected between the two concerns, wherein the General Control Co., Boston 34, Mass., will handle the sale of the counters, and will manufacture the related controls. The counters will be known as the Post Promatic Electronic Counters.

Capable of counting in excess of 10,000 units per second, the operation of this new counter may be either accumulative or pre-determined. The high-speed count is obtained through the use of photo-cell and electronic circuits. Miniature parts, as well as large bulky units, may be accurately counted.

A visual six-digit totalizer indicates the exact count, while a rate meter shows at all times the rate of count per hour. The counter is housed in a gray cabinet, and may be located as far as 75 feet away from the photo-cell head. Industrial type tubes, and rugged components, are used in its construction. Operation is 115 volts, 60 cycles.

STOP DUSTS INSTANTLY

with

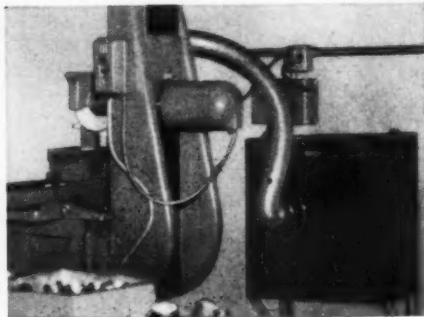
DUSTKOP

Available from stock of 22
standard models

300 cfm to 10,000 cfm

for: Surface Grinders, Tool and Cutter Grinders; Polishers and Buffers; Abrasive Belts and Discs; Woodworking and Plastic Industry Equipment . . . DUSTKOPS collect almost all kinds of industrial dusts.

Ask for Catalog 605-2. Describe dust problem for recommendation by return mail — no obligation.

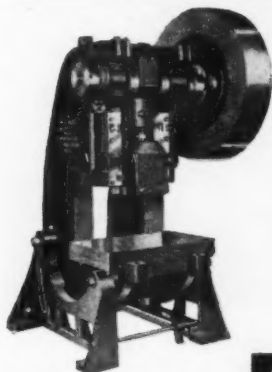


AGET-DETROIT CO.

205 Main St.

Ann Arbor, Michigan

YES ■ ■ ■ WE CAN FURNISH AN AIR FRICTION CLUTCH



7 Models—5 to
85 Tons Capacity

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PRESS-RITE

**85-TON
POWER PRESS**

The Press-Rite No. 85 is available with either the popular 4-Point Key Clutch or an Air Friction type Clutch. And you have your choice of the flywheel or back-geared models.

Get full details on the entire Press-Rite Line, TODAY!

Write for Bulletin P-650

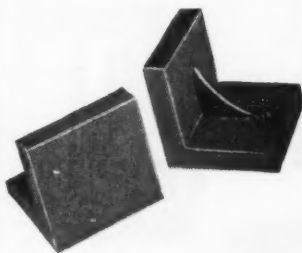
Sales Service Machine Tool Co.

PRESS
RITE
PRESSES

SHAPE
RITE
MACHINES

KELLER
OLD POWER
PRESS LINE

2357 UNIVERSITY AVENUE
ST. PAUL 4, MINNESOTA



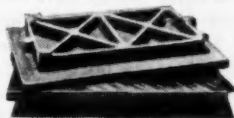
FROM STOCK

GRAY IRON **ANGLE PLATES** MACHINED $\pm .002$ FROM FLAT

2" x 2" x 2"	\$ 2.70
3" x 3" x 3"	3.60
4" x 4" x 4"	4.40
5" x 5" x 5"	8.40
6" x 6" x 6"	10.90
8" x 8" x 8"	16.70
12" x 12" x 12"	35.50

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B-M belt strapping unit

Inside diameter grinding, polishing and deburring operations have been simplified by adapting the Behr-Manning backstand method of coated abrasive belt finishing to this Belt Strapping Unit, recently introduced by Behr-Manning Corporation, Division of Norton Co., Troy, N. Y. Easily set up with a polishing jack on motor drive and a spring tension backstand idler, this unit greatly reduces the time normally required in inside diameter finishing of such items as forged parachute hardware, scissor and tin shear eyes, etc.

No shut-down time is involved in threading the coated abrasive belt through the opening of the piece being finished, as the operator merely releases the belt tension with a foot treadle which allows for belt slippage at the drive unit. Metalite Cloth abrasive belts, available in grit ranges from very coarse to very fine, produce finishes from rough removal of mold fins



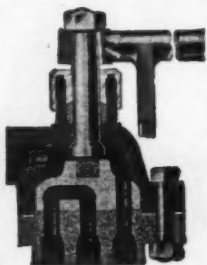
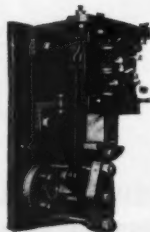
to the extremely fine finishes which are required prior to plating. The above illustration of the Belt Strapping Unit, shows the foot pedal spring release for ease of removing the belt to insert piece to be sanded.

Nicholson Control Valves **SET RECORDS** **for LONG LIFE**

In a wide range of plants—steel, metal working, processing, etc. — Nicholson cylinder control valves have now been in constant use for over 25 years. Their capacity for longer leak-free service is confirmed by many installation records which show Nicholson valves actually become tighter with use. This is because their flat discs tend to lap themselves on the seats.

W. H. NICHOLSON & CO.

117 OREGON STREET
WILKES - BARRE, PA.

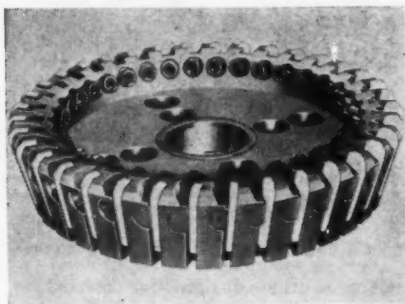


Nicholson standard and special valves in lever, foot, solenoid, motor types; for air, gas, oil, steam, water; size $\frac{1}{4}$ " to $2\frac{1}{2}$ "; press. to 5000 lbs. CATALOG 1250.

Steam & Air Traps • Control Valves • Expan. Mandrels • Arbor Presses • Welded Floats

Kennametal axial face mill

Kennametal Inc., Latrobe, Pa. has introduced a simplified axial face mill, Style MF Kennamill, having wedged-in solid Kennametal blades and structural features that make possible removal of cast iron at from 60 to 70 inches of table travel per minute. It is said to be suitable for both general purpose and high continuous production milling.



This mill has only four parts: body, blades, wedges, and nuts. Wedges and screws are one-piece high alloy steel, hardened and ground to close tolerances; they remain assembled to the cutter body at all times, thus reducing the possibility of lost parts.

The blades are heavy, solid and wedged-in — thus eliminating brazing strains. No special tools are needed to tighten them — a simple hex wrench suffices — minimizing breakage and wedge distortion. Blades are available in two styles — for cutting to a square shoulder or to a 45° corner. They are interchangeable in all slots of any size of cutter body of the same type. Wedges are round and are interchangeable in any slot of any size cutter, either right- or left-hand.

This cutter is mountable on any common spindle; it features more blades per inch of cutter diameter (3 blades to inch on 8" diameter or larger); The mill is suitable for all cast iron milling jobs, either roughing or finishing. It is of heavy construction with great rigidity.

The Style MF Kennamill is made in seven cutting diameters: 6", 8", 10", 12", 14", 16", and 18"; either right- or left-hand.

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All steel, arc welded frame. Easily operated hoist unit with automatic brake, safely holds load at any height.

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Type D, hand operated.....	\$254.00
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Type DX, hand operated.....	\$490.00
2000 pound capacity	
Type DX, hand operated.....	\$590.00
Floor lock to hold machine steady:	
\$16.00 extra for 500 pound sizes;	
\$24.00 extra for type DX models.	

List prices, F.O.B. Chicago, subject to current discount

ECONOMY ENGINEERING COMPANY

4505 W. LAKE STREET • CHICAGO 24, ILL.

Adjustable industrial lamp

Lindly & Co., 80 Herricks Road, Mincola, L. I., N. Y., has developed a new adjustable industrial lamp, featuring a two-lens condensing system and reflector that projects an intense uniform beam of light for all close work operations. A variable size spot of light ranging from $\frac{5}{8}$ " to 3" diameter is obtained by simply sliding the focus tube back and forth. This adjustment is also the means of getting illumination of variable intensity over a wide field.

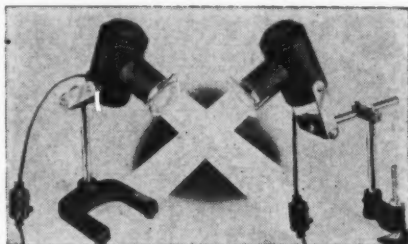
Ruggedly constructed and mounted on a heavy cast iron base with rubber feet, this vibration-resistant lamp features a mechanical adjustability that enables it to be placed in practically any position for convenience and best illumination.

For still greater flexibility, the universal clamp and extension rod, sold as a separate accessory, makes it possible to attach the lamp to any bench or machine and direct the light into the most inaccessible place at any angle.

A removable daylight filter for ease

and clarity in viewing, is provided with the lamp. The source of light is a small bright burning bulb, obtainable from any photographic supply store.

The Lindly Bright Beam Lamp produces brilliant, shadow-free illumination for objects being examined with stereoscopic and toolmakers microscopes, magnifiers and loupes. It is a



useful source of light for inspection, layout, profile grinding and milling, engraving, assembly of small parts, etc. Inspection of surface finishes, threads, profiles, optical surfaces, etc. is made easier and more accurate.



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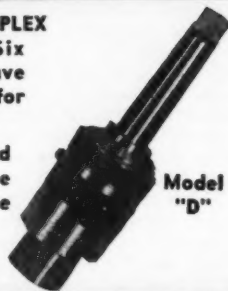
CHANDLER TOOL COMPANY, MUNCIE, INDIANA

WASTE NO MORE TEARS

On Boring and
Facing Problems

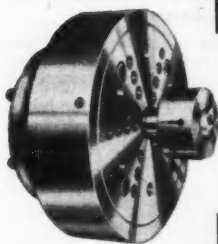
CHANDLER DUPLEX
Is Made in Six
Sizes—All Have
Power Feed for
Facing

• A Boring Head
that Won't Face
is Not Complete



Model
"D"

COMBINED BORING & FACING TOOL HEADS
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Foot switch features safety device

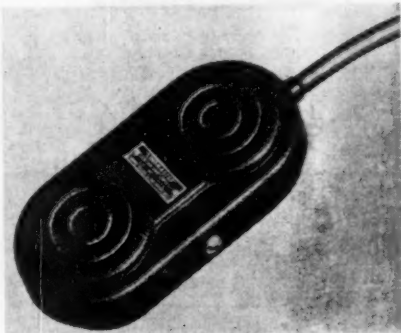
Safety and efficient operation are combined in the new "Linemaster" Lektro-Lok foot switch developed by the Simonds Machine Co., Inc., Southbridge, Mass. A mechanical interlock prevents both circuits from operating at the same time, an often required safety feature. Weighing only 10 oz., Lektro-Lok is a sturdy, precision built mechanism housed in a stamped metal casing with black crackle finish.

The Lektro-Lok operates on a "see-saw" principle with selective circuits. Pressure on one side opens or closes the line. Release of pressure returns the switch to normal off position, independent of the first. Both interiors can be wired normally open or normally closed. The single cord receptacle eliminates harness assemblies, all wiring connections being made internally.

The new Lektro-Lok foot switch is adaptable to sound transmission equipment such as wire or tape recorders; raising and lowering of appliances; in-

ter-communication systems, and many other applications.

The Linemaster Lektro-Lok Model L-2-S is a single pole, double throw, a-c unit, operating at 20 amps, 115 V,



10 amp, 230 V interiors. Cords sets are also available, and other electrical combinations are possible by using different interiors.

THE CRALEY OFFSET BORING HEADS



- Note depth of bearing.
- Tool carrying block most accurately fitted of any boring head made.
- Large graduated dial screw—easily read calibrations.
- Note minimized overhang.

- Tension screws on opposite sides and ends of block—all cutting strain thrown against solid metal.
- Nine sizes.
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LIQUID LEVEL ETC.



WRITE FOR CATALOG 700 -- PLEASE
MENTION THIS PUBLICATION
THE MERCOID CORPORATION
4201 BELMONT AVE. CHICAGO 41, ILL.

Industrial cleaner operates from compressed air source

A new industrial cleaner provided with a patented vibrating air valve that creates an agitating suction, forcing dirt and metal particles into a container has been introduced by Vibro-Pneumatic Cleaner Co., Division of Patterson Products, Maccabees Bldg., Detroit 2, Mich. The dirt container is carried on the back by a conventional belt and harness assembly (see illustration), and is encircled in a fabric shield. The total weight of the unit is 7½ lbs.



By operating one of two-finger-tip control valves, a vibrating external air jet is created. This jet is directed forward through an orifice in the cleaner head to dislodge dirt and metal particles from inaccessible places to spots where they can be picked up by constantly switching to a suction action.

Air consumption is minimized because of the vibrating valve action which sharply cuts off the air supply 2,000 times per minute. The cleaner head is of polished aluminum and the wands are lightweight tubing. No oil is required, since oil-impregnated powdered metal parts have been provided.

The agitating suction action dislodges and collects dirt and metal particles that steady suction will not pick up. No electrical components, which might create fire hazards, are used. The unit operates from any 80 p.s.i. or larger compressed air source.

Standard nozzle widths of 5, 8, or 10 in. can be had. Special designs will be made to suit customer requirements.

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CITCO "SOLID COPPER" DIAMOND TOOLS!
Fast re-setting & re-lapping service. Special
attention to Defense Contract problems.



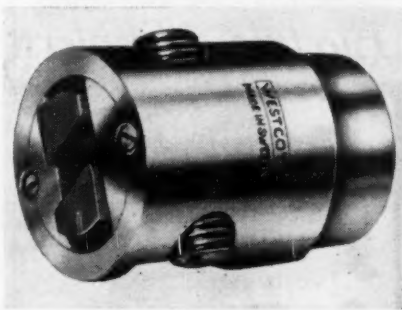
Wand lengths are from 14" to 6 feet, depending on the application. The amount of suction and air consumption can be adjusted to suit the conditions.

Westcott 2-jawed drill chuck

The Westcott Chuck Company, Oneida, N. Y., announces that it is now offering to the metal working industries of the country, through the Westcott dealer setup, a 2-jawed Drill Chuck which is being made for them in Sweden. The design is the same as the former Westcott "Little Giant" 2-jaw Drill Chuck, "Oneida" model, the manufacture of which was discontinued several years ago.

The new chuck is available in three sizes, as follows: No. 119-2, capacity 0 to $\frac{1}{2}$ "; No. 119-5, capacity 0 to $\frac{3}{4}$ "; No. 119-6, capacity 0 to 1". Morse Taper Arbors for the chucks are available as well as replacement parts.

The chucks are simple in design and construction; stated to be easy to operate; accurate, compact, and well finished. The upper part of the chuck



housing is reinforced with a steel collar. A T-handled operating wrench is supplied with each chuck.

EFFICIENT — LOW COST PRODUCTION

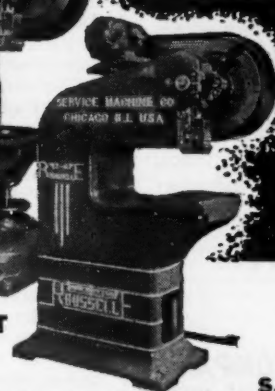
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SERVICE MACHINE COMPANY

JEMCO ---

Electric Nibblers



MODEL 75



MODEL 50

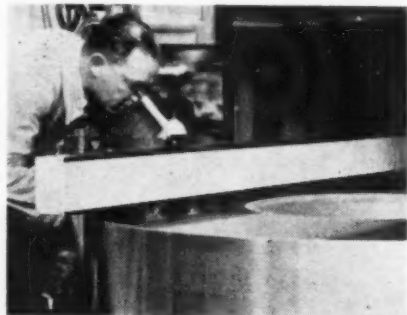
For speeding up nibbling jobs, Jemco Electric Nibblers provide an effective and economical solution. Made in two models . . . No. 75 for cutting 14 gauge (.0747). . . No. 50 for cutting 18 gauge (.0478) hot rolled sheet steel. Other materials in proportion. Jemco Electric Nibblers handle flat or corrugated sheets . . . uneven surfaces . . . and can nibble out corners! Cutting may be started anywhere on the material if access hole for anvil is made. Tools operate on either DC or AC . . . 110 or 220 volts. Feed: 3 feet per minute. Nibbling is done better, easier and faster with Jemco. Send today for full details and informative folders.

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AND MFG. COMPANY**
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Optical straight-edge simplifies contour measurements

By utilizing a beam of light as a straight-line reference, deviations of supposedly flat surfaces, as small as $\pm .00005"$, may be measured by the Griswold Huet Optical Straightedge introduced by F. T. Griswold Manufacturing Co., 305 W. Lancaster Ave., Wayne, Pa. This device consists of a lens and prism housing, and a feeler microscope with built-in illumination which rides along the surface under examination.



Made in standard lengths of approximately 3, 5, 10 and 13 feet, the housing rests on two blocks; the feeler, which includes the optical system, slides on the work surfaces. The errors observed through the microscope are indicated by the relative position of two indices. The distance between these indices is converted into linear measurement by reference to a micrometer thimble.

The surface contours may be graphically recorded by accessories attached to the equipment. Deviations, enlarged by 1000, are traced for permanent record on coordinate paper as the feeler is moved from one end of the housing to the other.

The Griswold Huet Optical Straightedge is stated to make possible performance standards which have heretofore been unattainable. It is both quick and accurate, and has proven useful in checking and correcting surface deviations in surface plates, machine tool tables, slideways, cylinders, flat beds and and other parts in manufacturing and laboratory processes.

DoAll "AA" grade gage blocks

The DoAll Company, DesPlaines, Ill., announces that its "AA" grade Gage Blocks are again available through its Sales-Service Stores in principal cities and representatives over-seas. At the close of World War II, this super-accurate classification ($\pm .000002$) was dropped, since the regular A and B grade blocks ($\pm .000004$ and $\pm .000008$, respectively) have ample accuracy for peace-time industry in general.



However, since the present speed-up in defense preparations, requiring absolute interchangeability between parts and assemblies, there has been an increasing demand for gage blocks of the highest possible precision. The "AA" grade gage blocks are used as laboratory masters, and provide a means of checking working gage block sets, precision comparators, and other precision gage instruments.

DoAll "AA" grade Gage Blocks are available in 37 and 83 piece sets and meet the specifications set up by the National Bureau of Standards with regard to size, flatness, parallelism, surface finish, hardness and stability. They are also "burr-proofed" to prevent the nicks and burrs which frequently appear on gaging edges due to ordinary use.

The DoAll Company also offers a completely integrated set of gage block accessories, such as gage holders, scribes, dial indicators, etc. These are designed to increase the use of gage blocks so that snap gages, height gages, etc., can be assembled with the Gage Blocks.

Hammond
OF KALAMAZOO

Model
"400"



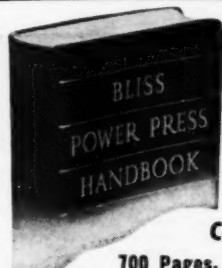
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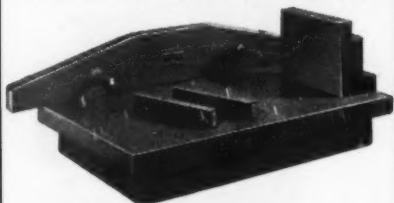
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which insures maximum
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our hands is your guarantee
of better tools at a great
saving.

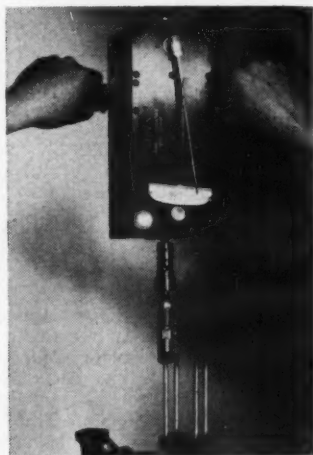
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Standard circular form tools
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COMPLETE ENGINEERING

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ENGINEERS TO AN INDUSTRY

Torque measuring tool driver

The new Garvin Torque-Indicating Driver, made by Tru-Circle Products Co., P.O. Box 536, South Bend, Ind., positively and automatically measures the torque as it drives studs, nuts, screws or fasteners, according to its manufacturers. It gives a precise torque measurement, and is further stated to eliminate stud breakage and reduce scrap loss. It also eliminates the need of wasting man-power on expensive hand-torquing inspections.



The Garvin Driver is built around a standard deflection-type torque wrench. In operation, the minimum torque is indicated by the wrench and by a green light; maximum torque is indicated by the same wrench and by a red light. The lights and the torque scale are on the front of the unit for easy operator reading.

The unit can be furnished with a relay that interrupts the power source and automatically stops the rotation when the desired maximum torque is reached. Adjustments for both high and low torque limits are easily made by two screws, using the torque wrench as an accurate gage. The wrench can be removed to check calibration.

The Garvin Driver is made in 0-100, 0-350, 0-500, 0-750, 0-1500 and 0-2000

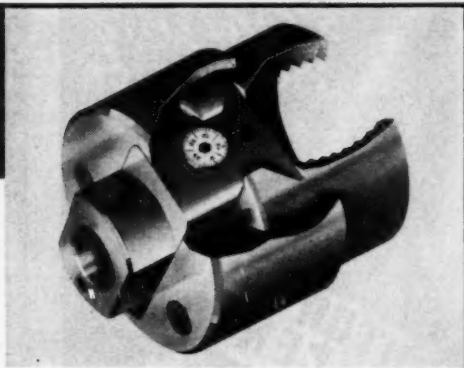
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Accessories Available

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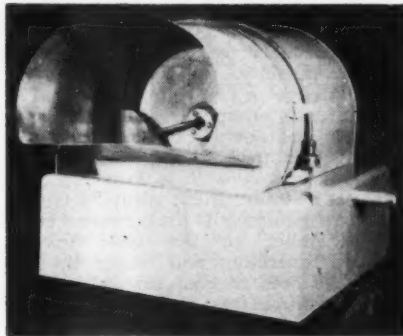


LAST WORD SALES CO. • 18500 Mt. Elliott • Detroit 34, Mich.

inch-pound capacities. Electric, high-cycle or air motors can be specified. The 0-100 inch-pound model is portable. The larger units are mounted on radial drill press type arms.

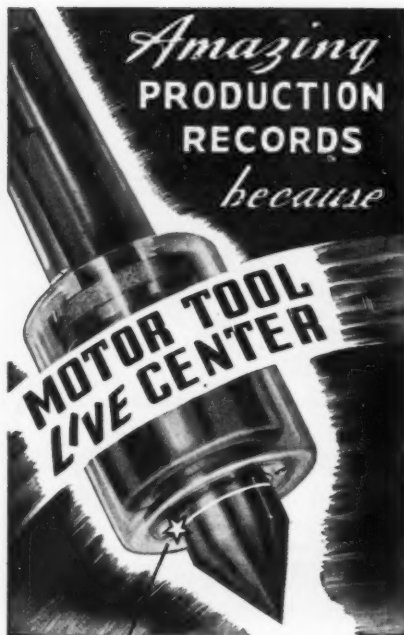
Impsco industrial humidifier

The Industrial Materials Purchasers Co., 401 Broadway, New York 13, N.Y., announces the production of its new Impsco Industrial Humidifier.



This new humidifier requires no ducts, pumps, compressed air nor steam lines. Each unit is a complete system in itself and only requires a water feed line; no return water line is required. The vapor is emitted in an extremely fine mist-like form. The humidifier works on the principle of atomization through centrifugal force. The manufacturers claim that this system produces the finest vapor at the lowest cost for equipment, installation, operation and maintenance. All parts are of standard manufacture and do not require special factory repair and replacement. The only part that requires regular replacement is the fiber glass filter over the air intake, and the size filter used is one purchasable through any supplier of air conditioning.

The new Impsco Humidifier has a vaporization capacity of one gallon per hour. Its weight is about 50 pounds. The dimensions are 12" wide, 14" high, 22" long. The water supply is used from ordinary drinking water mains at regular pressure. The motor is $\frac{1}{4}$ horsepower, 110 volts, 60 cycles.



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Look for the **RED BAND**

You no longer have to guess whether you are overloading your live center thrust bearings if you use **MOTOR TOOL LIVE CENTERS**. When the load is too great the **RED BAND** around the spindle disappears into the housing. You can see at a glance when overloading occurs. This is an exclusive feature, developed by Motor Tool which cuts repair costs to practically nothing if due diligence is exercised. As long as the **RED BAND** is visible you are running **COOL** and **SAFE**.

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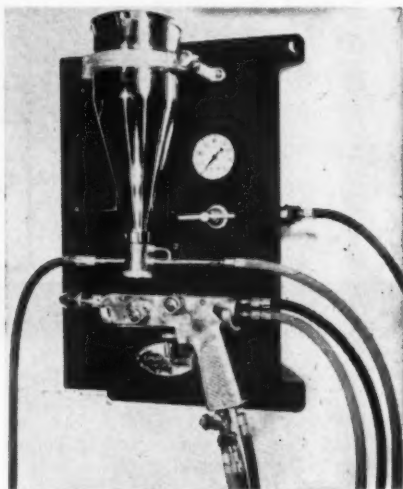
MOTOR TOOL MFG. CO.

P.O. BOX 3803 PARK GROVE STATION DETROIT 5, MICH.

Make It a Rule
to Call Motor Tool

Colmonoy model B Spraywelder

Wall Colmonoy Corporation, 19345 John R St., Detroit 3, Mich., announces a new model of their Spraywelder, a powder metallizing unit used to execute the Colmonoy Sprayweld Process. The Sprayweld Process consists of applying uniform overlays of Colmonoy Hard Facing alloys using metallizing procedures, then subsequently bonding the overlay to the base metal.

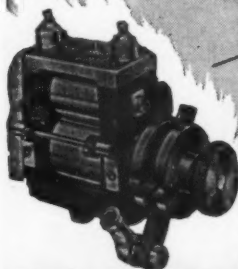


In addition, the Spraywelder can be used to apply metal powder castings such as copper, brass, stainless steel, aluminum and zinc.

The new Model B Spraywelder incorporates several new features; it has lighter weight. It is provided with an eye level air gauge. The air filter has greater capacity, and the air regulator is situated at a convenient height. The apparatus is equipped with more positive air and powder control valves. A new trigger mechanism permitting finger tip control, with a lock for continuous or intermittent spraying is now standard equipment. An increased cooling chamber in the head insures steadier operation and longer tip life. A locked feed mechanism on the carburetor eliminates a possible change in the powder feed setting.

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A truly remarkable unit which is a universal favorite and priced within your budget. Quality built for long dependable service. Models available to fit all sizes of power presses.



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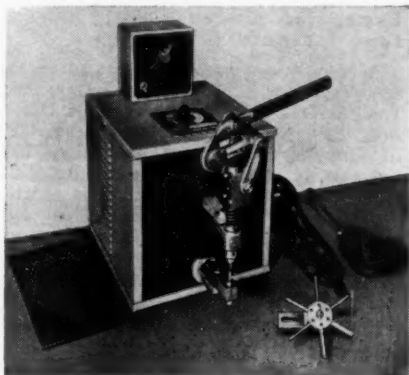
Joyal Products, Inc., 56 Belmont Ave., Newark 3, N.J., announces its new Resistance Spot Welding & Soldering Machine (Model 1000 WV, or 2000 WV— a.c. only), equipped with a timer. This machine is particularly useful to the manufacturer of small products. It solders or welds in less than a second.

The machine silver solders, soft solders and spot welds precious and dissimilar metals. It spot welds steel parts up to 3/32" in thickness. It will solder brass up to 1/8" in thickness as well as sterling silver and other precious metals.

The set-up for the various production operations is simple and rapid. Electrodes are especially designed for each job. Their operation is spring-action controlled so that, when electrode arms are closed, work is held firmly in position during soldering and cooling.

An automatic cut-off timer regulates soldering time. Heat control with eleven adjustments determines correct heat for

the job. When dials are set, uniform soldering time, heat, and holding pressure on the electrodes are maintained, regardless of how long the foot switch is held down.



The new machine is especially effective in soldering additional elements to an assembly, since it leaves no pitting

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One of the most difficult problems in tool making can be solved easily and quickly with Sturdy Square Holed Sleeves. The perfection of broached square holes can be had in boring bars, milling cutters and many other applications at a small fraction of the cost of imperfect hand-made square holes. The Sturdy Square Holed Sleeve consists of a round sleeve with a perfectly square hole broached through the center. This hole is tapped at one end to receive a back-up screw which is furnished with the Sleeve. The Sleeve can be sweated or pressed into a drilled and reamed hole to make a perfectly square accurate hole in a very few minutes.

The Sturdy Square Holed Sleeve will save you many hours and many dollars in the making of boring bars, tool holders and other tools requiring square holes.

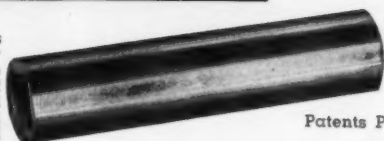
BUSHINGS MADE IN FOLLOWING SIZES:

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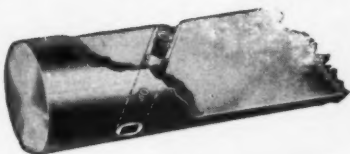
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Patents Pending



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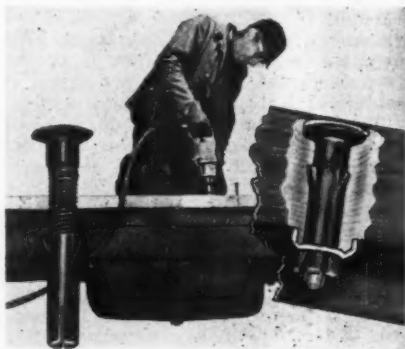
marks. It is particularly applicable to the assembly of fine parts in instruments and electronic components—also for spot welding ferrous and non-ferrous metals.

Expansion sleeve type fastener

A new one-man expansion sleeve type fastener is announced by Square Tool & Die Co., Chicago Drillet Division, 1550 N. Fremont St., Chicago 22, Ill. Created to reduce labor costs, this fastener is stated to be radically different in design than any other existing fastener. Its use eliminates the second man required in inserting and tightening a conventional bolt and nut. Since it has no nut, it requires no one to hold it.

The bolt is simply inserted in the hole. A pneumatic tool drives the bolt through the sleeve and expands six prongs at bottom of the sleeve. This forms an extremely tight grip which cannot work loose due to vibration. The bolt head automatically counter-

sinks itself below the wood surface, eliminating the possibility of ripping and tearing of materials caused when passing over exposed bolt heads.



This fastener is made in sizes from $\frac{1}{4}$ " to 1" diameter; lengths from 1 inch up, and with hex, square, round, flat or slotted heads. The company offers free field demonstrations.



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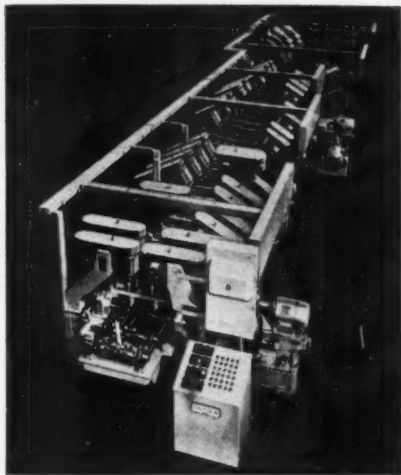
43-station automatic transfer machine

A new 43-station, automatic transfer machine featuring auto-sequencing control has been designed and built by Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich., for drilling all oil passages and lightening holes in cast iron alloy crankshafts.

Designed to eliminate much handling and to maintain a high rate of production, the machine has a production capacity of 74 pieces an hour at 100% efficiency, or 52 pieces an hour at 70% efficiency.

Crankshafts are automatically positioned and clamped hydraulically prior to drilling at each station. Indexing throughout the work cycle is accomplished automatically by a hydraulic transfer-type unit which provides rapid and smooth indexing. Holes are then blown out and automatically inspected at the last station.

High speed steel tools revolve at 40 f.p.m. with a feed of .008" per revolution



on lightening holes and controlled feed on oil passages. Easily accessible, the tools can be changed quickly. Drills for oil holes are mounted in keyless, hand-

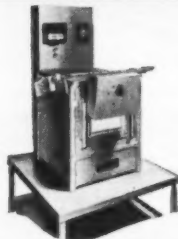
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operated chucks. Stroke is 16", station to station. Standard Snyder guide bar units and Leland-Gifford deep hole units are used.

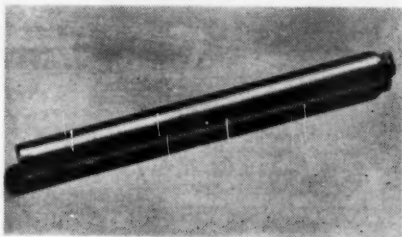
As a special safety feature, an emergency cord running the full length of the machine is provided to stop the index and return all units rapidly. The lubrication is motor driven and fully automatic. Coolant supply is from a central system in the building. Floor space required for this machine is 12 x 60 feet.

Carbide tipped wheel dresser

A Boron Carbide tipped abrasive wheel dresser has just been announced by Robert Marks Co., 47 Goddard St., Providence, R.I. The insert on this device is "Norbide," the Norton Company's moulded Boron Carbide, stated to be the hardest compound in the world. This material is stated to be significantly superior in hardness to tungsten carbide, aluminum oxide or even silicon carbide; diamond alone is harder.

The wheel dresser consists of a mas-

sive long-lasting insert $\frac{1}{4}$ " square x $\frac{1}{4}$ " long, set in a convenient aluminum handle 5" long. This device has been designed specifically for the free hand dressing of grinding wheels 10" in diameter or less and of M grade of hardness or softer. This new hard carbide dressing tool is particularly useful in



tool room work and in forming wheels for tool and cutter grinding. It is claimed by its manufacturer to shape and dress grinding wheels much faster than the silicon carbide sticks commonly used for this purpose.

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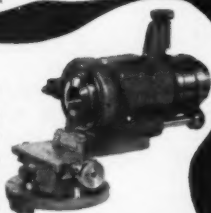
Universal

CUTTER GRINDING FIXTURE fits any universal tool or surface grinder. The basic unit, shown here (standard accessories not shown), with its four attachments, below, provide a quick and accurate answer to nearly all cutter and tool grinding demands.



Precision BALL END MILL

grinding is done with this compact, easily-operated fixture. An exceptionally flexible instrument, it grinds up to 2 1/4" dia., sets at any angles or radius with any cutting clearance on square, conical or ball nose shaped end mills.



◀ The MULTI-SWIVEL VISE attachment employs three swivels for quick set-up of any compound angle.



◀ This versatile INDEXING LOCK BRACKET may be set up in any position at either end of spindle housing on basic unit.



◀ For precision GRINDING WHEEL DRESSING this attachment will handle any two angles as well as set radius.

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Abbeon industrial dehumidifier

The Abbeon Supply Co., 58-10 41st Drive, Woodside, N. Y., announces its new Dehumidifier Model DMS 4, after extensive laboratory and field tests.

This unit is stated to be capable of dehumidifying any closed area of tight construction up to about 8,000 cubic feet. In addition to its efficiency, the manufacturer stresses its compactness and portability.



For its installation, the operator simply plugs it in and lets it go to work. The moisture collection pan may be emptied by hand about once a day or a garden hose or copper pipe may be connected for automatic discharge of condensate through a floor drain, window or sewer. The manufacturer can, if desired, supply a simple "plug in" control like a home thermostat to keep the humidity at any desired percentage.

The principle used is that of an electric refrigerator. Moisture-soaked room air is drawn into the dehumidifier by a fan located inside the unit. This air then passes over cold coils where it is deposited in much the same manner as beads of moisture form on the outside of a pitcher of cold water on a hot humid day. This water then drops into the pan for removal.

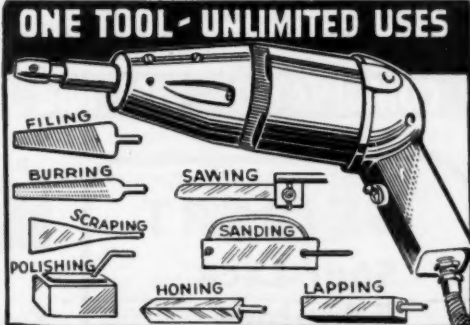
The new Abbeon Model DMS 4 Dehumidifier is powered by Silent World hermetically sealed Tecumseh Compressor. The Redmond fan motor is permanently lubricated. The evaporator coil is of aluminum with extended sur-

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face for maximum efficiency. The condenser uses finned copper tubing. The power consumption is 115 volt, 60 cycle, 2 amps. The airflow capacity is 110 c.f.m. The length is 17", width 13", and height is 15 $\frac{1}{2}$ ". The weight is 55 lbs.

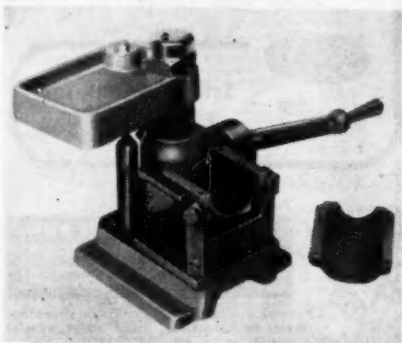
Auto-Swing-Jig permits visibility in operation

A new type of top-loading drill fixture, the Auto-Swing-Jig, has been introduced by A. H. Bowlzer Manufacturing Co., 10130 San Vincente Ave., South Gate, Calif. This ingenious device has the unique advantage of lifting and swinging the bushing plate aside automatically, when the operating handle is moved in the proper direction.

On the reverse stroke of the handle, the bushing plate swings back into place over the work piece, and instantly locks in clamping position. While in the closed position, the bushing plate is maintained in alignment by two hardened and ground steel pins.

Easier and faster to reload than the conventional box jig or the so-called standard jigs for comparable work, the

Auto-Swing-Jig is said to work well in drill press operations which require deep nesting or tall locating pins, because the bushing plate is out of the way during reloading. Because of



unhampered vision with the bushing plate swung aside during reloading, the operator can quickly see if chips are cleared away; he can also watch his operation during reloading of the jig.

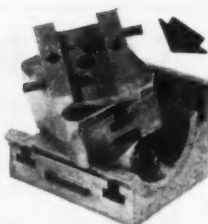
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money through easier and faster grinding. By using this vise for carbide sharpening you will save valuable carbide which is usually lost when free-hand grinding. Easy to use. Use on any surface grinder.

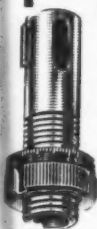
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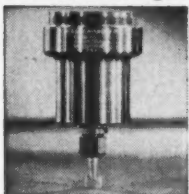


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Vulcanaire precision spindles



New Vulcanaire precision spindles are being produced by Vulcan Tool Company, 731 Lorain Ave., Dayton 10, Ohio. These new spindles, employing the same type of infinitely controlled high speed air operated and cooled motors as originally produced and still used in the Vulcanaire Jig Grinder, are precision units for most spindle applications.

Only $3\frac{1}{8}$ " long, they are being adapted to practically any machine for high precision production, finishing contours on hardened steel working surfaces for cams, fingers, or levers, burring or milling die castings, carbide milling or finishing slots.

Ten micro inch finish using carbide mills and six micro inch finish using mounted points is being maintained on high speed production.

It has been found that an air cooled, air lubricated motor is best for the high speeds required for most applications. With room temperature air and oil continually circulating through the grinder, heat and expansion are controlled. All parts of the Vulcanaire are made of alloy steel machined and ground with extreme care to maintain perfect balance. Thus grinding, milling, burring, routing can be accomplished with the utmost precision.

The length of the Vulcanaire air motor ($3\frac{1}{8}$ ") allows it to be adapted easily, using a minor part of machine capacity. It is being used on special gear shapers for grinding eight slots automatically holding total tolerances to .0005"; on pantograph engraving machines, using carbide and high speed steel points; on internal grinders for grinding small holes efficiently, since the correct surface speed per minute can be maintained; on special machines to grind hardened cam fingers for business machines, where shaving dies or heat treatment will not give satisfactory micro finishes or accuracy, on surface grinders, lathes in precision grinding operations, and similar precision applications.

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Hammond Machinery Builders

1614 Douglas Avenue

Kalamazoo, Michigan

Richmond radial drill

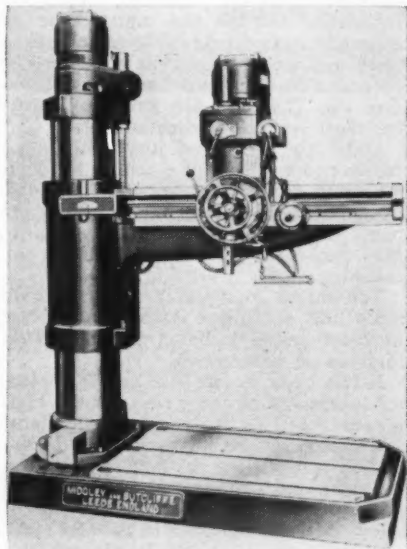
This precision radial drilling machine, manufactured by Midgley & Sutcliffe of Leeds, England, is available through British Industries Corp., International Machinery Division, 164 Duane St., New York 13, N. Y. The machine is noted for its extreme accuracy, and is guaranteed to very close limits.

The rigid and compact design is provided with easy and rapid control by centralized levers, thereby reducing fatigue and idle time to a minimum. The machine has an all-electric drive, with one motor providing drilling, and one motor for elevating power, both motors being controlled by a single joystick type switch on saddle; operated through a contractor panel built in the rear of the arm.

All driving gears are made from chrome nickel steel, heat treated and ground on the teeth; shafts are of high carbon heat treated steel, and all run in ball bearings. Sliding gears are mounted on six spline shafts. A wide range of spindle speeds is provided for economical tapping, boring and drilling in steel or alloys. Lubrication of the saddle gears is positive and dependable by a built-in pump. The electricity supply conforms to NEMA standards, 220 volt, 3 phase, 60 cycle.

The base plate is of rigid construction with three T-slots running over the total length. Coolant is arranged to drain along wide channels round the base to a large capacity interior reservoir. Pillar is of the single pillar design. Arm is box type construction, diagonally ribbed internally to withstand drilling stresses. The bearing of the arm of the

pillar is formed by annular roller bearings at the top and bottom of the long and sturdy barrel portion. Power is supplied through a collector ring at the top of the pillar which allows the arm to swing completely through 360°. Saddle is of box section and all mechanisms are totally enclosed. Spindle is of high



carbon steel and nose is bored No. 4 Morse taper, heat treated and ground. Quick hand traverse, fine hand feed, and automatic feed to the spindle are provided, and an automatic depth trip for knocking off at any predetermined depth of hole it fitted. Moreover, the

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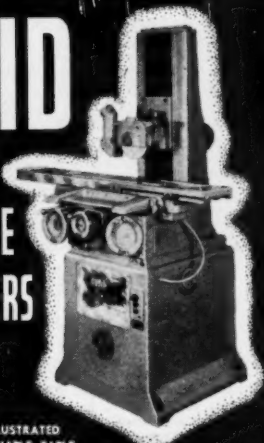
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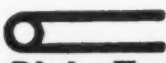
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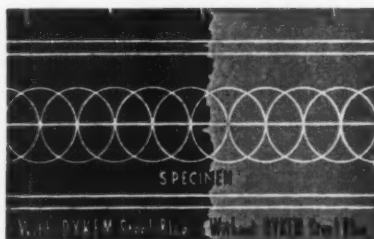
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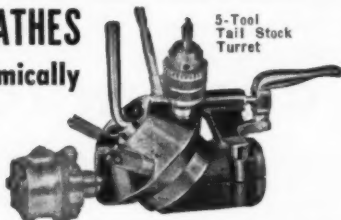


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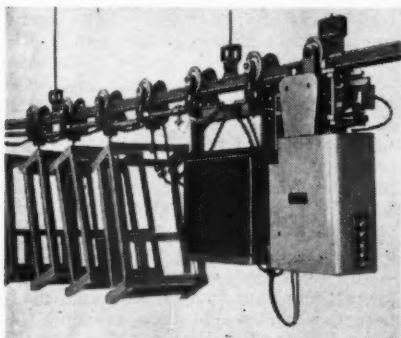
JEFFERSON MACHINE TOOL COMPANY, 700 W. Fourth St., Cincinnati 3, Ohio

feed is automatically disengaged at the lowest position. Two ranges of 12 spindle speeds are provided from 20 to 1800 r.p.m. All levers are concentrated within easy reach of the operator. One lever serves for the forward and reverse rotation of the spindle and also for raising and lowering the arm.

Overhead conveyor system

The Bloom System, Inc., 19431 W. Davison Ave., Detroit 23, Mich., has announced a new overhead conveyor system, called Mono-Dyne. The unit is battery powered, making it independent of any outside source of energy. Since the driving power is self-contained and travels along with the conveyor itself, the Mono-Dyne system is not subject to the usual limitations of an ordinary electrified system.

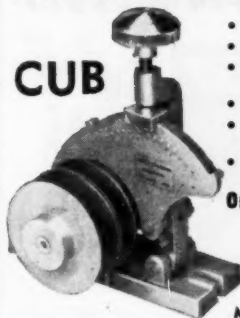
By eliminating the need for overhead wiring, Mono-Dyne systems can be installed at a considerable savings. The system can be easily incorporated into present manually operated systems, thereby making them power operated at low expense. The unit is capable of multi-speeds, forward and reverse, and is operated either by push button control or remote control. It can operate outdoors, from plant to plant, as well as inside, and is capable of ascending grades.



The manufacturer states that Mono-Dyne systems may be used for production line conveying, materials handling and for the general transportation of materials and goods within a building or between buildings.

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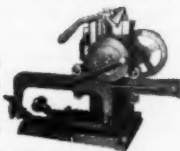
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STANDARD NO. 2 4 x 4 DRY CUT BENCH MODEL

- Lifts on return stroke
 - Ball bearing guide
 - Automatic cut off switch
 - Angle cutting by turning saw. (Saw turns instead of work)
- Price \$112.00 less motor
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ATLANTIC ADJUSTABLE LIMIT SNAP GAGES

ACCURATE GAGING
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COMPLETE LINE OF PRECISION INSTRUMENTS
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**PORTABLE
ELEVATING TABLE**



**Saves
TIME
and
LABOR**

Eliminate heavy lifting and cut handling costs. Slight foot pressure varies height up to 15½", leaving operator's hands free. Table swivels and locks in any position.

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LAY-OUT AND
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13 COLORS

For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheet, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for sample and circular on company letterhead.

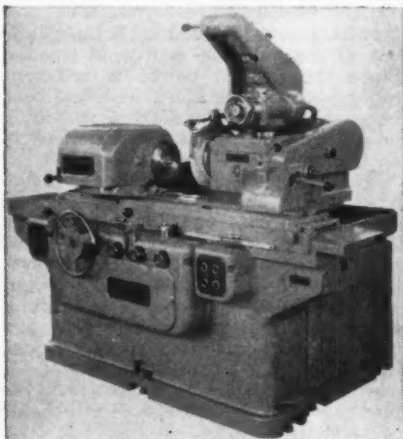
**MICHIGAN CHROME &
CHEMICAL COMPANY**

6340 E. Jefferson Ave., • Detroit 7, Mich.

**Landis hydraulic universal
grinder improved**

Major improvements for the 10" x 24" Type CH Hydraulic Universal Grinder have been announced by the Landis Tool Company, Waynesboro, Pa., manufacturers of precision grinding machines.

This machine is now equipped with the latest design swinging type internal grinding fixture which was previously available on the 12" universal grinder only. This fixture has been developed



for quick change-over from external to internal grinding operations. The housing on which the motor is mounted and in which the internal spindle is fitted is hinged to a casting mounted on the wheelbase. The angle is of the tapered bearing type, so that any play which may develop can be easily eliminated. The internal fixture is driven by a 1 h.p. motor. A variety of internal spindles and grinding quills are available.

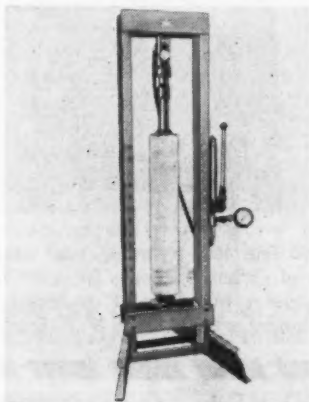
For operations that require an internal grinding fixture with additional power, a removable type internal fixture, driven directly from the regular wheel drive motor, is available.

Another new feature on the 10" x 24" Type CH Universal Grinder is a hydraulic type, rapid wheel positioning mechanism which advances or retracts the wheelbase as needed. It is not a

grinding feed. In cases where internal and external grinding is done in one set-up, it eliminates the need of turning the hand wheel by hand in order to position the grinding wheels. The action of this mechanism is controlled from a lever at the front of the machine, controlling both speed and direction. A safety interlock prevents it from being inadvertently operated during a normal grinding set-up.

Clair hydraulic arbor press

A hand operated 20-ton hydraulic Arbor Press is introduced by Clair Manufacturing Co., 1030 S. Union St., Olean, N.Y. Primarily developed for mounting buffs on polishing spindles for Clair Surface Finishing Machines, the press, designated as Model K, also is recommended for many additional operations such as broaching, assembling, straightening, bending, offsetting, squeezing, pressing, flattening and blanking.



In the buff mounting operation illustrated above, a hollow ram extension slips over the polishing spindle to exert pressure downwards on the polishing buffs. For other types of operations the table may be easily adjusted to any desired height. Offering a ram travel of 5", the design permits the pump and ram to be removed from the steel framework and used throughout the plant as a portable unit. Dimensions inside the framework are 17¼" x 60".

FISHER BENDER



This sturdy, hand-power bender will bend up to:

½" square or round iron

2" x ½" channel iron

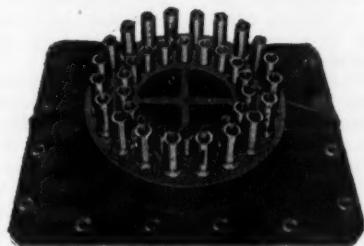
2¼" x ⅜" flat iron cold

Weight:
40 lbs.

Immediate
Shipment

New circulars covering our line of benders, cutters, and punches available.

T. H. LEWTHWAITE MACHINE CO.
312 East 47th St. New York 17, N. Y.



Pictured: a 38-Spindle Heavy-Duty Drill Head

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DETROIT

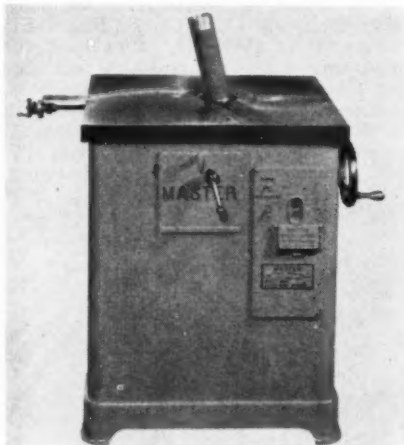
Deep Holes—Exclusively

Tilting spindle sander and grinder

The Spindle Sander and Grinder for wood, metal and plastics, incorporating several new and exclusive features, has just been introduced by the Kindt-Collins Co., 12653 Elmwood Ave., Cleveland 11, Ohio.

The manufacturer states that this is the only spindle sander and grinder of its type that is equipped with tilting spindle rather than a tilting table. The job on which the operator works is always in a horizontal position. The Master Spindle can be used oscillating or non-oscillating; it can be tilted from 0° to 45° by a worm and gear unit, and can be securely locked in place at any desired position.

The exclusive core box attachment produces straight and tapered core-boxes mechanically, eliminating tedious hand work and materially reducing the time involved. Other features include a lighted periscope for easy reading of extremely accurate settings; a 2 h.p. constant horsepower motor, with choice



of 2000 and 4000 r.p.m. speeds; adaptability of abrasive sleeves from 1/4" to 4" in diameter, and 6" to 11" in length; also grinding wheels up to 6" in diameter

SAVE

TIME and MONEY
with

SUPEREAM

STOP-PINS
AVAILABLE IN 5 SIZES



FINGER STOPS
IN 3 SIZES



STOP-PINS are complete self contained units that hold securely in stripper plate. All sizes have 1/32" wall permitting insertion close to die or punch. No threads inside STOPS for springs to catch on. Write for literature and prices.

SUPEREAM FINGER STOPS made in uniform width to fit any standard width slot. Just grind ends to fit.

Write for literature

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WE MAKE NEW CUTTERS OUT OF YOUR DISCARDED TOOLS AT A FRACTION OF NEW TOOL COST.

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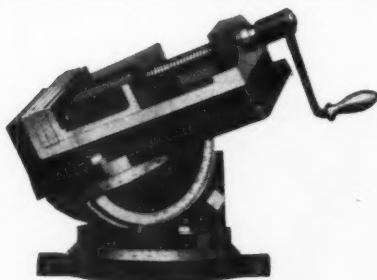
LET US QUOTE ON THE MANUFACTURE OF SPECIAL TOOLS, BOTH HIGH-SPEED AND CARBIDE.

ALSO REPAIRING OF CARBIDE TOOLS. MAKE USE OF OUR EFFICIENT TOOL SHARPENING SERVICE. SPECIAL GANGS OF CUTTERS TO MICRO PROJECTOR ACCURACY.

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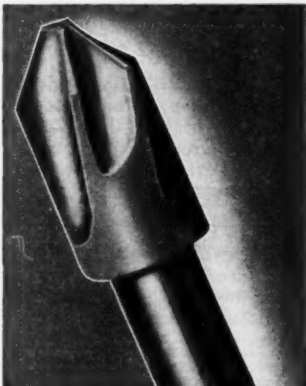
SAVE TIME!

on intricate, angular set-ups with the MASTER MULTI-SWIVEL VISE. Fully universal. 3 swivels instantly set any compound angle. Parts interchangeable. Optional accessory: Platen, interchangeable with vise. This vise used in machine shops throughout the world. Circular on request.

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Six staggered cutting edges give shearing cut that eliminates all chatter.

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THE MULTIFORM BENDER

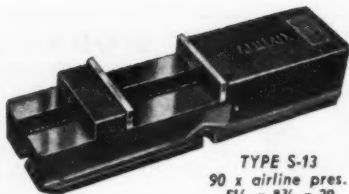
PRODUCES — Springs, Stampings,
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No Special Tooling

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AIRLOX PNEUMATIC VISES

Five senior models. Many special-purpose construction. 50 to 200 times airline pressures. Write for data sheets • Wedge-&-lever action utilizes total cylinder drive. Pat'd. Exceptional rigidity particularly suited to work-holding on CARBIDE MILLING, and almost all milling operations.



TYPE S-13
90 x airline pres.
5/4 x 8 3/4 x 29
Max. jaw opening 12"

Whitehall, New York

production devices, inc.

and 5" high. A built-in safety device prevents the use of the high speed with the large diameter units.

Citco hydraulic diamond turner

The Citco Hydraulic Diamond Turner, manufactured by the Cleveland Industrial Tool Co., Inc., 1080 E. 222nd St., Cleveland 17, Ohio was originally designed for Cincinnati Centerless Grinders. It is now available for Landis Camomatic, I. W. and Heald Internal Grinders. On Heald Internal Grinders, the turner can be adjusted to one sixteen hundredth of one turn per dress, (approximately 1/4 degree) thereby eliminating loss of size on precision internal grinding.

Features of the Citco Hydraulic Diamond Turner include the adjustability to three ranges of degrees, its automatic control which splits segments at the completion of each turning cycle, and its maintenance of a new and ever ready cutting edge throughout the life of the diamond.

Successful in all its claims, which in-

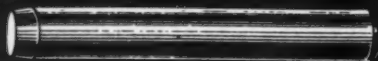
clude cutting diamond and grinding costs, stepped-up rate of production, and increased efficiency, it has also been helping produce high production



micro finishes, the need for which, in many cases, has presented a problem for manufacturers with defense contracts.



SCHULTZ & ANDERSON
dowel pins



Immediate Delivery!

Standard Size Dowel Pins from 1/8" to 1" diameter and from 3/4" to 6" length supplied in .0002 and .001 over basic sizes. Unless otherwise specified, .0002 oversize will be furnished.

Dealer inquiries invited.

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Complete engineering and manufacturing facilities for your broaching applications. Expert service for sharpening and reconditioning your broaches. Standard keyway broaches in stock.

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Air-O-Chek
THE VALVE WITH
THE INTERNAL
FULCRUM LEVER

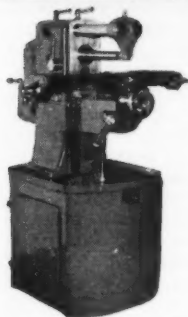


For blowing chips from work — For cleaning out hollow sets, machine recesses and tee slots— For drying parts before inspection and for many similar uses, Air-O-Chek is the Air-gun.

Write for details

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HEALD — MILLING MACHINE



All Castings Normalized

No. 1B HEAVY DUTY HORIZONTAL BACK GEARED

Listed at the right are only a few of the many features which make the Heald Milling Machine the preferred equipment in many plants. New features include a quick release lever to simplify feed changes, uniform belt tension and others. Write now for pictorial folder complete with specifications. Your copy is free. Write today.

- **PRECISION BUILT**—designed to meet requirements of heavier, higher priced equipment. All dovetails and sliding surfaces ground finished, including table top.
- **ONE-PIECE COLUMN**—a heavy one-piece casting.
- **ARBOR SUPPORT**—2 Heavy $2\frac{1}{4}$ " overarm shafts are held rigid by 2 locks on column.
- **WIDE RANGE**—of spindle speeds makes possible the use of wider cutters and deeper, smoother cuts.
- **BOX TYPE KNEE**—with long 55° ways assuring long wear and extreme accuracy.
- **BALL BEARING THRUSTS.**
- **QUICK SETTING DIALS**—accurately graduated in .001.
- **BACK GEARS**—mounted on ball bearings, are engaged by moving outside lever to forward position. Direct drive in back position. Can be shifted while machine is running.

GENERAL MACHINERY & EQUIPMENT CO.

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"DAVIS" KEYSEATERS



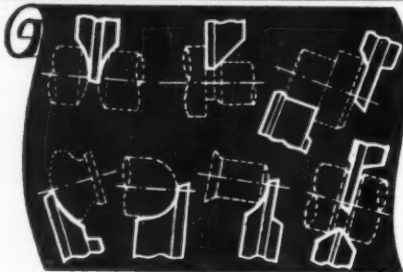
are
moderately
priced
Efficient
Economical
Durable

Built in 3 sizes for cutting keyways 1/16" to 1" width. Circular upon request.

DAVIS KEYSEATER CO.

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DO YOU USE "PICK-UP TOOLS"
FOR ANY OF THESE OPERATIONS?



It's no longer necessary or economical to "hand grind" tools or purchase "made to order" tools for short run jobs. Let SOMMA STANDARD CIRCULAR FORM TOOLS give you uniform, correct dimensions, better finish and appearance, less set-up trouble. In short — maximum production at the lowest cost.

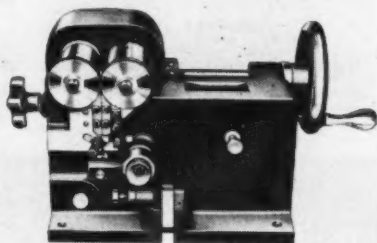
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SOMMA TOOL COMPANY

20 BROWN ST. WATERBURY, CONN.

Perkins precision spring coiler

A new Precision Spring Coiler, manufactured by Perkins Machine and Gear Co., West Springfield, Mass., has just been introduced by Connors & Davis Sales Corp., Circuit Ave., West Springfield, Mass., sales agents for the device. The Precision Spring Coiler will make torsion, compression, extension and tapered springs, coiled either right or left hand, with no changing of arbors.



The machine will handle wire stock from .005" to .125". Springs can be made with or without initial tension, and with open or closed ends.

In operation, the wire is fed down between two rolls through a guide, then is locked by a movable wire guide and arbor that is brought up into position on each side of the wire. Wire passing from the wire guide and arbor comes into contact with an adjustable grooved point known as the coiling point.

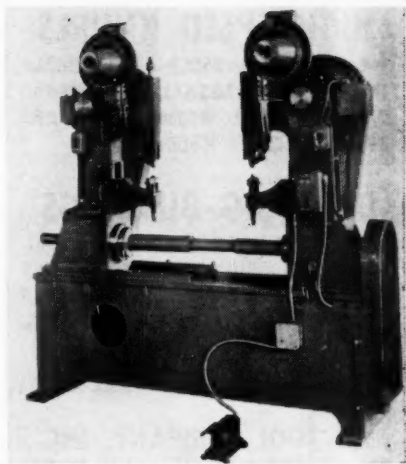
By turning the machine's handle, the gears revolve the two wire feed rolls, forcing the wire downward against the coiling point. The wire then becomes deflected into a coil. The raising of the coiling point causes the outside diameter of the spring to be increased or decreased. This is the important feature of the machine—while the spring is being made, the outside diameter can be changed. Once the outside diameter is established, an endless length of spring may be coiled.

Tapered or conical springs may be formed on the device, as well as standard type springs. In order to create a lead or pitch in the spring, a device on the front of the machine provides for such an operation without altering the set-up. The machine is equipped complete with three wire guides, three wire feed rolls and two coiling points.

Dual rivitor sets two rivets at a time

A new "Dual Rivitor" designed to save time and labor in assembly and riveting, has been furnished to Allis-Chalmers Mfg. Co. by the Tomkins-Johnson Co., Jackson, Mich. It is equipped with 10" hoppers, and tooled to feed and set automatically two $\frac{1}{4}$ " dia. x $\frac{5}{8}$ " long wagon box head rivets at a time, in elevator chain and raddle assemblies for farm implements.

This machine consists of two 8" Model "R" Rivitors, mounted face to face on a common base, adjustable for rivet spacings ranging from $2\frac{1}{2}$ " to 18" center to center. One motor drives both fly-



wheels, which are synchronized by a combination gear and chain drive arrangement. Both clutches are tripped by solenoids, connected to a single foot switch.



100,000 stocked in 450 sizes for immediate delivery. Special r'd points within 48 Hrs. Order today & economize. Data sheets on request.

Ring Punch & Die Co.

108 Foote Ave., Jamestown, N. Y.

NIELSEN

Heavy Duty

Live Centers

Write for catalog on live centers

Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

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HIGH SPEED KNURLS

WE STOCK ALL SIZES REED KNURLS IN STRAIGHT, DIAGONAL AND DIAMOND PATTERNS FOR BOTH LATHE AND SCREW MACHINE HOLDERS.

DRILL JIG BUSHINGS

LARGE NEW YORK STOCK FOR AMERICAN DRILL JIG BUSHING CO. WE CARRY THOUSANDS OF HEADLESS PRESS FIT, SLIP RENEWABLE, LINERS, AND HEAD PRESS FIT BUSHINGS.

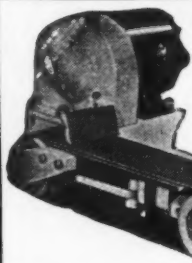
GOOD DELIVERY FOR SPECIAL SIZES.

SID TOOL COMPANY, INC.

126 LAFAYETTE ST., NEW YORK 13, N.Y.

CANAL 6-4946-4947-4735

ONE OF THE LARGEST CUTTING TOOL DEALERS IN THE EAST.



STANDARD D-4 Abrasive Band Grinder

Famous
for
Stamina

This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood fibre . . . at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood 4x36 1/4" band. The ideal portable unit.

OTHER STYLES AND SIZES IN NEW MANUAL ON FINISHING—WRITE TODAY

WALLS SALES CORP.

333 Nassau Avenue, Brooklyn 22, N. Y.

Transfer buttons for duplicating die holes in new work

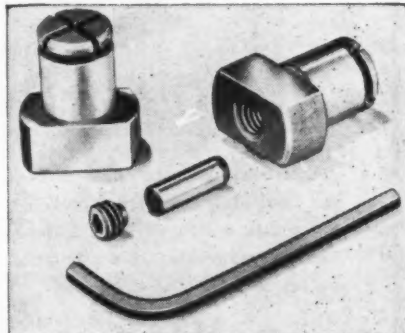
The Reid Tool Supply Co., 709 Baker St., Muskegon Heights, Mich., announces a new line of transfer buttons for transferring blind unthreaded spring pocket holes in dies to new work quickly and accurately. The transfer button can be fastened securely in the hole to be transferred simply by tightening a socket set screw locking the transfer button in place. Then the piece holding the transfer buttons is placed on the work in which holes are to be transferred, the operator strikes a sharp blow and the true center is recorded.



The transfer points are made of hardened tool steel and are held firmly in the body of the transfer button by a set screw. When the points become worn they can be replaced with new ones. Holes of various diameters can be transferred with one impression, since all sizes have a uniform shoulder height.

Jergens sine fixture key

The Jergens Tool Specialty Co., 712 E. 163rd St., Cleveland, Ohio, announces the new development of a new Sine Fixture Key that is stated to eliminate



five operations heretofore necessary in milling fixture key slots.

According to the manufacturer, the new Sine Fixture Key saves up to 50%

of labor costs in laying out and milling fixture base plates. The unusual stemmed construction of the "S" Fixture Key requires a bored hole in place of the standard milled fixture key slot, thereby completely eliminating the need for the usual milling operations and set-ups. The manufacturer further states that all Jergens Sine Fixture Keys are interchangeable and are complete with self contained locking device.

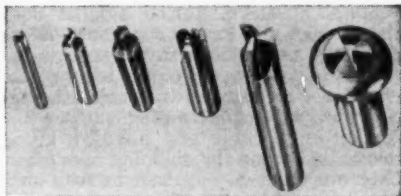
Hollow mills hold concentricity within .0005"

Especially designed small Hollow Mills, of extreme precision, having an o.d. of $\frac{5}{16}$ " and under, are now available from Woodruff & Stokes Co., Inc., 349 Lincoln St., Hingham, Mass. These hollow mills are not stock items; each is "custom" designed and manufactured to meet specific customer requirements.

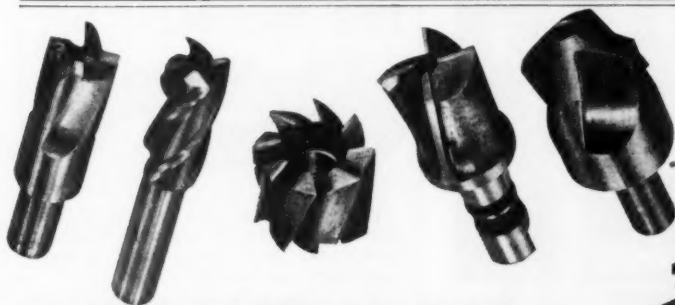
One manufacturer found the answer to an intricate milling operation by having W-S engineers design a special hollow mill. Using standard procedures, the job would have been very costly, if at all possible. Although only a small

quantity was required, the manufacturer estimated that tool cost was returned on the initial 10% of the run.

Machined of carbon or high-speed steels or special steel alloys, W-S Hollow Mills may be plain or adjustable, with internal or external steps, for left hand or right hand screw machine work.



They are specially heat treated for long life and precision made to tolerances required by each customer's specific needs. Woodruff & Stokes has developed special manufacturing methods to obtain sharp cutting edges and smooth surfaces, which reduce wear and drag to a minimum as well as assuring long tool life.



Write for
Bulletin 90FM
Hydraulic
Flutemiller

WORK DONE BY THIS AUTOMATIC FLUTEMILLER

- Mills straight and spiral flutes
- Mills tool automatically, no attention required
- Low in cost
- No special skill

The WARDWELL Mfg. Co.

3165 FULTON RD.

CLEVELAND 9, OHIO

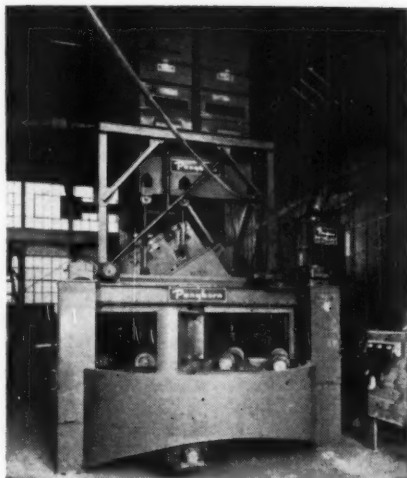


Rotoblast drum cleaning machines

Two Rotoblast drum cleaning machines which simplify and speed-up the removal of rust, paint and other foreign materials from 30 and 55 gal. returnable steel drums and lids before re-use, are announced by Pangborn Corporation, Hagerstown, Md.

Metal abrasive, hurled against both the interior and exterior surfaces of the drum by centrifugal force, scours the metal in a few seconds, leaving no chemicals or alkalis to wash off, and providing a clean bonding surface for repainting. Drums are handled automatically during the cleaning operation; only one man is required to load and unload the barrels.

The Model ES-400 illustrated, is designed to clean from 1000 to 1100 drums and drum heads a day, or 125 to 140 per hour. The Model ES-382 will clean 320 to 560 drums and covers per day, or 40 to 70 per hour. Both machines clean on the same principle. Metallic abrasive is thrown against the surfaces of the



Rotoblast vaned wheels, which revolve at 2300 r.p.m. The cleaning cycle takes from 50 to 90 seconds, depending upon the nature of the material to be re-



THE EXCLUSIVE FEATURES OF DARRA-JAMES SINGLE & MULTIPLE SPINDLE DRILL PRESSES!

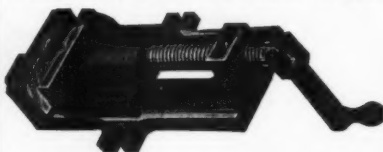
New 15" heavy duty, production model drill presses with dozens of specially designed and engineered features — Before you buy —

WRITE FOR BULLETIN D.P. 51

toolcraft
CORPORATION
SPRINGFIELD, MASS., U.S.A.



YOST DRILL PRESS VISE



This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

Offered in two sizes.

Vise No.	Width of Jaw, inches	Opens inches	Weight Pounds
1D	3 1/2	3 1/2	12 1/2
2D	5	5 1/2	23

Do you need a vise of ANY type?

Write today for bulletins on the extensive Yost line

YOST MFG. COMPANY

1335 SO. MAIN STREET
MEADVILLE, PENNSYLVANIA

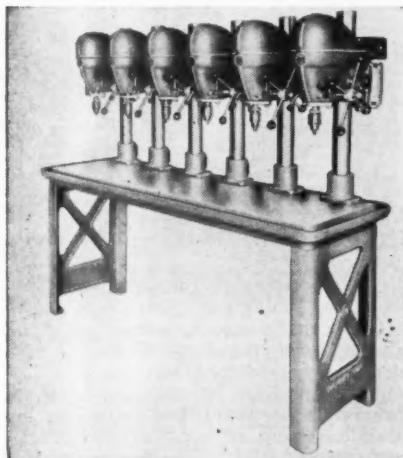
moved, and the facility with which the operator loads and unloads the drums.

Drums are handled differently by the two machines during the cleaning operation. The larger capacity Model, ES-400 (above), consists of a table divided by a partition. On either side of the partition are holders for the drums to be cleaned. While one drum is being cleaned in the cabinet, the other is exposed for unloading the cleaned barrel and loading the next drum to be cleaned. The unit is 23'5" in height, and occupies a floor space of 13'3"x20'6".

Spent abrasive, mixed with the material it has scoured from the drum, is cleaned of all dirt and broken particles by a separator and returned to the machine for reuse. Automatic shut-off

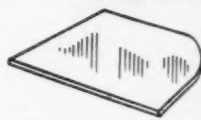
Darra-James drill presses

The Toolkraft Corporation, Springfield, Mass., announces a new line of nine heavy duty, production model, industrial Multiple Spindle Drill Presses. Standard 15" models are available in one to six heads mounted on a large rugged table with cast iron legs.



Many exclusive features, such as self aligning grease sealed ball bearings, double hinged guard, lifts from front to rear, free floating six spline spindle, modern streamlined design, are engineered into these new Darra-James Drill Presses.

PLYMETAL BRAZING SHIMS for CARBIDE TOOL TIPS



- In
• **SILVALOY #2501 and**
• **SILVALOY #5031**

Silvaloy No. 2501 and No. 5031 are clad materials furnished in three thicknesses:
.020 thick consists of .010 copper center—clad both sides with .005 Silvaloy No. 2501
.011 thick consists of .005 copper center—clad both sides with .003 Silvaloy No. 503
.016 thick consists of .008 copper center—clad both sides with .004 Silvaloy No. 503

Each of the alloys are furnished with or without radius, square or rectangular, Pentagon shape 80 degree with radius, Pentagon shape 60 degree no radius, triangle, circles, etc. Available in all standard tool sizes.

Shims are also available in Silvaloy No. 503, No. 2501, Constantine and Copper.

STEEL SALES CORPORATION

3348 So. Pulaski Rd., Chicago 23, Illinois
Bishop 7-7700

PERFORMANCE PROVED THRIFTMASTER Gear Driven Eccentric Type

Adjustable DRILLHEADS

- **Rugged FULL BALL BEARING** Construction—hardened parts used throughout.
 - **31 STANDARD MODELS**—to fit a wide variety of specifications.
 - **DRILLING CAPACITIES**—from No. 60 to 1 1/2" in Steel—rated to drill disintegration.
 - **FULLY ADJUSTABLE**—from 1" min. to 14.2" max. 2 to 4 spindles.
 - For Drilling, Reaming, Tapping and other machining operations.
 - Prompt Delivery on Standard Heads.
- Full Line of Standard Universal Adjustable and Special Fixed Center Drillheads . . . Automatic Reverse Tap or Drill Units. Write for the Thriftmaster Catalog.



Subsidiary of Thomson Industries, Inc.

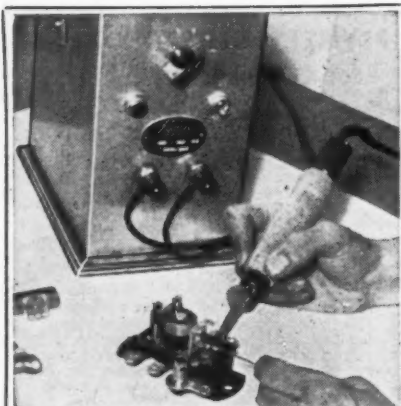
Also makers of
DORMAN AUTOMATIC REVERSE TAPPERS
4 Sizes • Friction & Positive Drives Capacity
No. 2-36 to 2" in Steel.

THRIFTMASTER PRODUCTS CORPORATION

Division of Thomson Industries, Inc.

1030 N. PLUM STREET, LANCASTER, PA.

STANDARD UNIVERSAL ADJUSTABLE AND SPECIAL FIXED CENTER DRILLHEADS

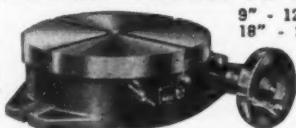


FOR FASTER, SAFER SOLDERING

The Luma resistance method of soldering is the accepted way for small shops requiring single operation to large plants with many types of operations. Write for complete information about this remarkable tool.

LUMA ELECTRIC EQUIPMENT CO.
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TROYKE ROTARY TABLES WORM WHEEL OPERATED ROTARY TABLES . . .



9" - 12" - 15" -
18" - 21" - 25"

BALL BEARING STATION INDEXING TABLES . . .



12" - 15" - 18"

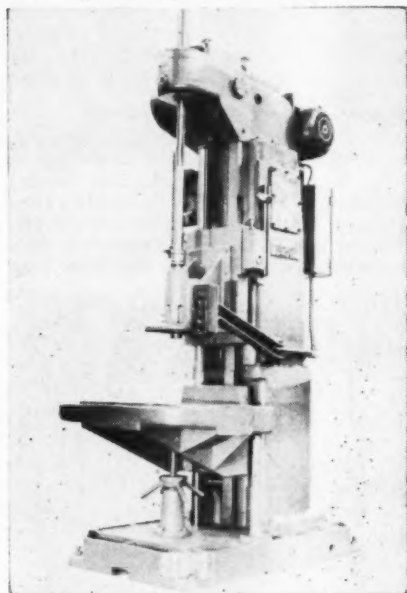
See your
dealer or
write for
Catalog 14

TROYKE MFG. CO.
CINCINNATI 9, OHIO, U.S.A.



Vertical hydraulic drilling machines

The Standard Machine & Tool Company, Ltd., of Windsor, Ontario, Canada, is introducing four newly designed vertical hydraulic drilling machines which are available to United States industry. These new Drill-masters are designed in 3, 5, 10, and 15 horse power models. The column castings are of meehanite iron, with flame hardened and ground ways. The geared head mounted on top of the column provides a large range of speeds through use of pick off gears.



These drills use, for actuation of the sliding head, the John S. Barnes hydraulic type 34 feed and traverse circuit. Feeds from $\frac{1}{2}$ " to 12" per minute are available. Dwell is obtained by the simple setting of a valve. Skip feed and step drilling can be included if desired. The hydraulics are to J.I.C. standards. The 3 h.p. machine has a 12" stroke with a drilling capacity of $1\frac{1}{2}$ " in steel at .010 feed per revolution. The 5 h.p. machine has a 15" stroke with a drilling capacity of $2\frac{1}{2}$ " in steel at .010 feed per revolution.

STEVENS ROTARY TABLES STANDARD AND DIAL TYPES



Table graduated for single degree reading. Precision and accuracy. Thirty years' experience designing circular attachments.

Write for circular.
Four sizes, two types of each.

JOHN B. STEVENS INC.
486 Canal St. New York 13, N.Y.



UNIVERSAL LATHE CHUCKS

Send For Catalog G-WU-50

THE WHITON MACHINE CO. New London Conn.

"THE ORIGINAL" MAUSER
**MAUSER PRECISION
VERNIER CALIPER**

\$14.75 PPD

MONEY BACK GUARANTEE
FOR MEASURING INSIDE,
OUTSIDE, AND DEPTH.
3 GRADUATIONS
1/1000" - 1/128"
1/10 mm. IN BACK

NEW EXCLUSIVE GAMLOCK AND
DIB IMPROVEMENT INSTANTLY
FIXES SETTING, PREVENTS
SHIFTING, GUARANTEES
SQUARENESS OF JAWS.
THE MAUSER TRADEMARK...
IS YOUR PROTECTION.

GEO. SCHERR CO. INC. 108 LAFAYETTE ST., N.Y. 12, N.Y.

PYRO Radiation Pyrometer

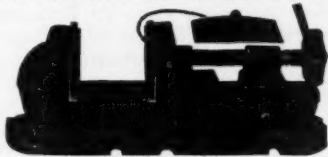


Determines spot temperatures of heat-treating furnaces, fire boxes, kilns and forgings accurately—instantly. No thermocouples, lead wires or accessories needed. Temperature is recorded on direct-reading dial at press of button. Two double ranges. Write for FREE Cat. No. 100.

The PYROMETER INSTRUMENT Co.
New Plant and Lab., Bergenfield 3, N. J.

GEM VISES

Their Usefulness and Stamina is Proven



Write for complete information.
J. E. MARTIN MACHINE WORKS
Springfield, Ohio

BREMIL

The IMPROVED Compound Lever Shears

ALL ALLOY
FULLY
GUARANTEED



Two Sizes

PORTABLE

No. 1 cuts up to No. 11 gauge strip or sheet.
No. 2 cuts up to 1/4" steel plate.

BREMIL MFG. CO.
1720 Pittsburgh Ave., Erie, Pa.



DRILL THESE HOLES

BY A QUICK, EASY, INEXPENSIVE METHOD
Your business letterhead will bring literature
WATTS BROS. TOOL WORKS
Wilmerding, Pa.



ABRASIVE CENT-R-LAP TOOL

Saves time, eliminates diamond dressing. Cones changed in seconds. Available in 2 sizes 3/8" and 3/4" Cent-R-Laps and abrasive Cones.

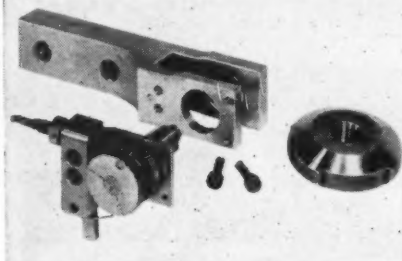
Write for descriptive literature and prices.

J. R. Reich Manufacturing Co.
45 E. Stroop Rd. Dayton 9, Ohio

The manufacturer claims increased production, decreased maintenance and better product quality control, as well as great versatility when the Drillmaster is used with an indexing table, multiple drilling head and auxiliary units.

Automatic roll marker

New Method Steel Stamps, Inc., 147 Jos. Campau Ave., Detroit 7, Mich., has introduced a new and improved



model of its automatic roll marker for screw machines, etc.

Designed to eliminate secondary

marking operations, the improved roll marker is stated by its manufacturer to be notable for the simplicity and speed with which dies can be changed when required. To change the die (or rotary type holder as the case may be) it is only necessary to remove two Allen cap screws. When these are removed, the keyed die shaft and starting point adjustment screw assembly come out in one unit, releasing the die. Another die is then held in position, the shaft slid through the die and holder and the Allen cap screws are inserted and tightened.

All parts including bearings are standard, the latter being available from any jobber. Use of ball bearings eliminates the need for boring, reaming and pressing in of solid bushings.

For shops handling a limited number of different parts, solid roll dies are recommended. For plants handling many different parts, interchangeable type roll holders with a font of replaceable type are available. Various diameters of solid or 'type' rolls are interchangeable in the same marker.

High Speed
COUNTERBORES
BACK
SPOT
FACERS



Interchangeable

*Catalog
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BICKNELL-THOMAS COMPANY
Greenfield . Massachusetts

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Small and Medium

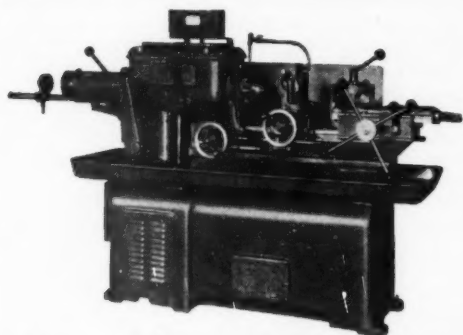
- SPURS
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GEAR WORKS, Inc.
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Plain or Back-Geared — Forged steel spindle with anti-friction precision bearings, friction clutch and brake. Spindle nose, $2\frac{3}{8}$ "-8.

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1725 North Broadway, Albany 1, N. Y.

New York Offices: 50 East 42nd Street

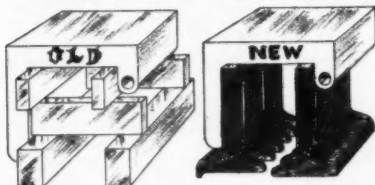
HERE IT IS!

The new Simmons No. 2 Turret Lathe, offered to you with three distinct advantages:

- **Low Cost**
- **High Precision**
- **Early Delivery**

$1\frac{1}{4}$ " bar capacity . . . 14" swing over ways. Micro-Speed Drive offers infinite speeds—plain, 375 to 1500 RPM; back-geared, 44 to 750 RPM—for bar or chucking work. Power feed to turret.

EVOLUTION of ELEVATION



This is it!

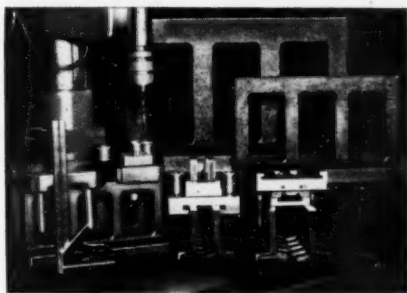


**MACHINE
and BENCH**

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MAGIC PARALLELS —SIX POPULAR SIZES—

$3\frac{1}{4}$ " $4\frac{1}{4}$ " $6\frac{1}{4}$ " $8\frac{1}{4}$ " 10" 16" HIGH



MAGIC CITY MACHINE TOOL CO.
Dept. BB 2128 S. Walnut Muncie, Ind.

. . . Salesmen Wanted

Four-power 2" magnifier

Inspectors, tool and die makers, engineers, and all those seeking a magnifier that will enlarge without the slightest distortion, will welcome the new, accurate four-power 2" double lens magnifier announced by Henry Hildebrandt & Associates, P.O. Box 228, Burlington, Wis. This precision instrument quadruples the size of curved or straight line subjects with absolute precision.

Called the Hofer & Logan Magnifier, this useful device consists of an all-metal frame 2 1/8" in diameter and 7/8" thick; it houses two separate optical ground and polished 2" lenses that are scientifically mounted and press locked so as to make them positively dust-proof. The construction of the press-locked mounting further provides a great resistance to breakage. The unit is light in weight and may be carried in the vest pocket.

Attention is called to the advantages of the Hofer & Logan Magnifier when used by engravers or workers in other fields where 100% accuracy is vital.

The Magnifier is easily adaptable to special jobs such as for inspection purposes along an assembly line, or for

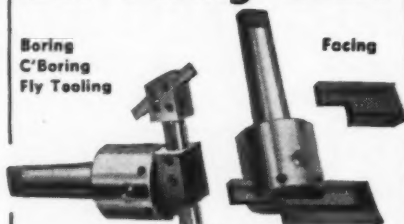


meticulous drilling or cutting. A complete line of holding attachments covering every need is also available.

Cut Boring Costs

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Blind Hole Bottoming

Many enthusiastic users report that the Behr Boring Bar actually pays for itself in the first four weeks of operation. Just ask the man who uses one.

This proven patented bar is chatter proof, extremely accurate and ultra efficient. Has interchangeable blades and accessories.

It is unequalled for versatility and efficiency.



BEHR

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PRODUCTS COMPANY
WARREN, MICHIGAN



MICRO MINIATURES

- PRECISION GROUND FROM SOLID!
- FASTER CUTTING! LONG LIFE! STRENGTH!

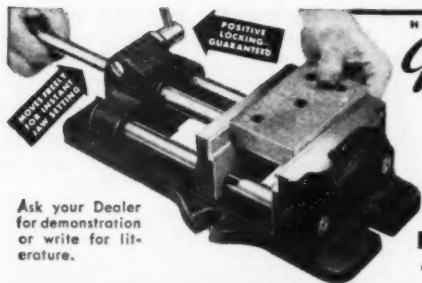


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WOODSON TOOL CO.

4811 LENNOX BLVD. INGLEWOOD, CALIF



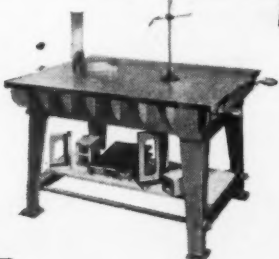
Ask your Dealer
for demonstration
or write for lit-
erature.

HEINRICH
Grip-Master
Screwless Vise

GRIPS WITH SPEED CUTS TOOLING COSTS

Step up drill press production with the Heinrich "Grip-Master" Screwless Vise—with the patented "Circle Grip" hammer blows cannot break. Work is automatically leveled; jaws set instantly, effortlessly. 3", 4", 6", 8" jaw widths; ideal as base structure for drill jigs and fixtures.

NATIONAL MACHINE TOOL CO.
DEPT. 101-J • RACINE, WISCONSIN



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THE KEYNOTE TO ACCURATE MEASUREMENT

Over twenty years of experience gives you "proved" performance — added assurance of quality production. Milwaukee Surface Plates, Angles, Parallels and Straight Edges are all made of the highest quality semi-steel and finished to exact dimensions.

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Engineers and Machinists Since 1907
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MELCO CENTER POINT LUBRICANT

SOLD IN TUBES, QUARTS, GALLONS, DRUMS

Made in both oil and grease form . . . designed for use on lathes and milling machine centers; grinding machine centers; steady rests and heavy journals; tapping, broaching and extruding; any application where extreme pressure or frictional heat prevails. Reduces frictional heat . . . thus an excellent additive for cutting, broaching or drawing oils.

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SELLEW (Standard DRILL HEADS)

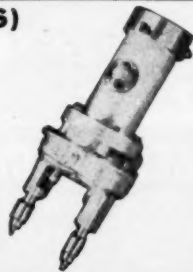
will greatly increase your drilling output

In stock for immediate delivery.

No. OAD min. .65" max. 3.4" — 1/8" drill
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No. 1D min. 1.16" max. 6.33" — No. 1 M.T.
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Heads with fixed spindles designed and built to customer specifications.

Send Us Your Drilling Requirements

SELLEW MACHINE TOOL CO. Inc. 1910
PAWTUCKET, R.I.



PROMPT DELIVERY on
HIGH-SPEED Motor
WIRE STRIPPERS Driven

Price: \$125.00

F.O.B.
 Rochester, N.Y.



Instantly and completely removes insulation from solid, stranded or multi-conductor cable up to 1/2 in. dia. Stripping length adjustable up to 1 1/2 in. Equipped with 1/4 HP, 110 volt single phase motor including cord, switch and plug.

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The HIGH SPEED HAMMER CO., INC.
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CLEAR

NAMEPLATE MARKING

MODEL
 No. 4



The nameplate on your product is your signature; keeps it neat and legible! Accurate location and alignment are assured

with this
**NAMEPLATE
 DETAIL PRESS**

- Simple Operation
- Perfect Alignment
- Uniform Depth

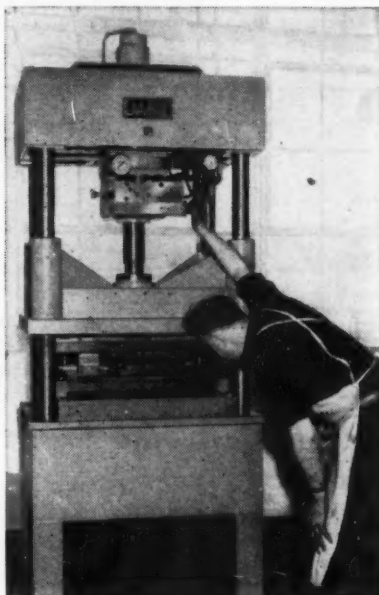
GEO. T. SCHMIDT, INC.



1804 W. BELLE PLAINE AVE.
 CHICAGO - 13 - ILLINOIS

Dake hydraulic try-out press

A new series of hydraulic presses, designed for use in die matching, to avoid tying up production equipment has been introduced by Dake Engine Co., Grand Haven, Mich. The manufacturer states that these presses may also be used for short production runs, and for manufacturing samples.



The new line of presses includes both single- and double-acting designs, in capacities ranging from 25 to 125 tons. All models are actuated by a simple hydraulic mechanism which is operated either by electric motor, or by an air cylinder designed to attain maximum power and speed at 90 or 145 pounds air pressure.

The single-acting models are powered on the up stroke, and return to starting position by gravity. The double-acting models are powered on both up and down strokes, . . . and are provided with a rapid advance mechanism which operates until the press is brought under load—automatically changing to power advance for the remainder of the stroke.



We've been solving them for industry for nearly 60 years. Stamps and marking devices for all purposes.



Steel stamp and dies; roller dies, embossing dies; machine engraving. Dies and Plates. Write for catalog.

Marking Devices Since 1893

MERKERT AND SONS
146-16 JAMAICA AVE., JAMAICA 2, N.Y.

STERLING DRILL GRINDER



CAPACITY:

$\frac{3}{8}$ " to $2\frac{1}{2}$ " drills.
5" x 9" adjustable table.

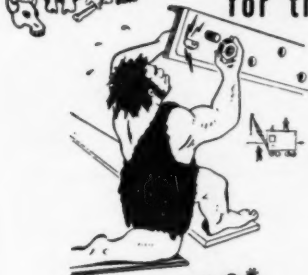
MOTOR: $\frac{1}{2}$ hp,
3450 rpm.

NET WT: 250 lbs.

CRATED: 320 lbs.

MCDONOUGH MANUFACTURING CO.
EAU CLAIRE, WISCONSIN, U. S. A.

...DON'T BE A CAVEMAN
...use the **RIGHT TOOL**
for the job!



a BILLINGS
will do it better!*



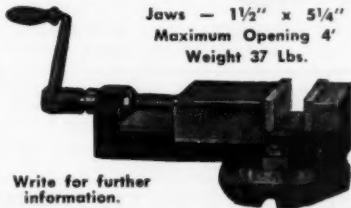
Ask your BILLINGS DISTRIBUTOR
He'll tell you why!

* CARBON STEEL
DROP FORGED
STRUCTURAL WRENCH

NEW BRITAIN

SWIVEL VISE

Jaws — $1\frac{1}{2}$ " x $5\frac{1}{4}$ "
Maximum Opening 4"
Weight 37 lbs.



Write for further
information.

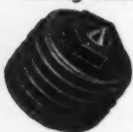
The body is made of semi-steel; the jaws of tool steel hardened and ground. All working surfaces are ground. The vise is as accurate as is possible and the degrees are cut to very close limits.

NEW BRITAIN TOOL & MFG. CO.
NEW BRITAIN, CONN., U. S. A.



A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long sought—a more accurate and surprisingly faster way of transferring blind screw holes.



The Heimann Transfer Screw Set is a self-contained, complete tool. No wrenches or pliers are necessary. Made in $\frac{1}{4}$ " to 1" diameters. Send for price list.

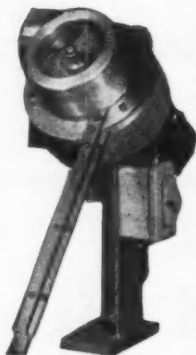
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332 Lincoln Ave.

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Reynolds

**AUTOMATIC
HOPPER
FEEDS**



Eliminate costly handling operations by delivering part automatically to work position. Parts poured into the motorized hopper are arranged and fed as required.

Several types available suitable for feeding a wide variety of parts.

Send sample of part to be fed when writing for quotation.

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**MORE
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**DURANT
SCRAP CHOPPER**



LOW FIRST Cost
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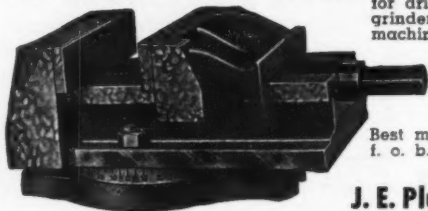
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Economical operation
Fits Any Power press

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155 ORANGE ST., PROVIDENCE 3, R. I.

PLUNKET IMPROVED VISES



We make a complete line of modern vises for drill presses, shapers, milling machines and grinders. Illustration shows our standard milling machine vise as regularly furnished and stocked.

In ordering this vise give size of slot in table:
No. 10—6" jaws, $1\frac{1}{2}$ " deep, opens 5"
wt. 45 lbs.\$68.20
No. 20—10" jaws, $2\frac{1}{4}$ " deep, opens $8\frac{1}{2}$ "
wt. 120 lbs.\$92.40

Best material and workmanship. Prices are net f. o. b. Chicago. Dealer's inquiries are solicited.

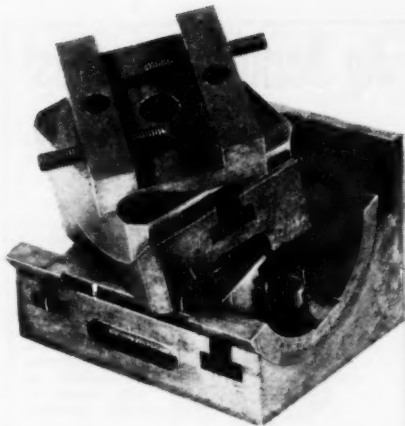
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J. E. Plunket Machine Co., 1823 W. LAKE ST.
CHICAGO 12, ILL.

New universal vise for grinding compound angles

An ingenious, time-saving universal vise has been placed on the market by Combination Vise and Jig Co., Orfordville, Wisc. With this universal vise any compound angle can be ground without guesswork, and without the use of angle parallels. Even if the top has a complicated clearance, no angle parallels are needed. No mathematical computations, or books, or charts, are necessary for the efficient use of this device.

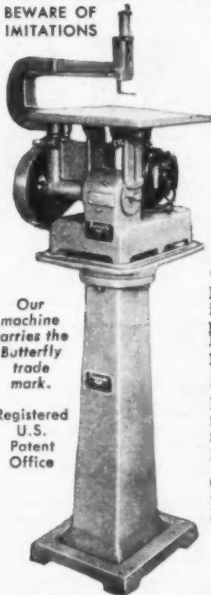
The vise is composed of a base on which is fitted a rocker. A sub-base fits on top of this first rocker; on top of the sub-base rests another rocker. On this last rocker is the tool holder which can take tools up to 1½" wide. The top rocker will also compensate to obtain proper angles on ends. All rockers are graduated, there being four graduations. Everything is a positive lock; a patented feature being the lock which holds the sub-base to the lower



rocker. The unit is as accurate as it can be determined with the naked eye.

When the vise is used as a holder to hold tools while being sharpened or made, considerable time is saved over

BEWARE OF
IMITATIONS



Our machine carries the Butterfly trade mark.

Registered U.S. Patent Office

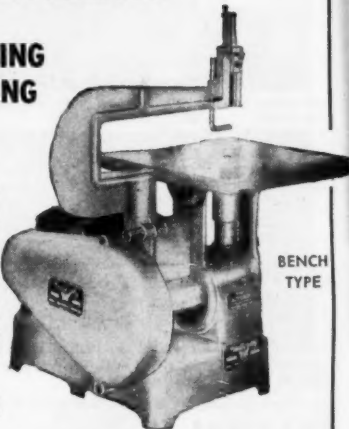
TO INCREASE PRODUCTION TO IMPROVE EFFICIENCY

USE BUTTERFLY FILING AND DIE MAKING MACHINE

MOUNTED
ON
PEDESTAL

This is a powerful machine, for heavy or small precision work in use all over the world: Airplane Factories, Ammunition Plants, Toolrooms where fast production is desired. 4 Models, No. 16, No. 14, "EL" and Model "D". The larger the model, the larger the stroke and therefore more filing is performed, furnished with or without pedestals.

Constructed as per Specification of U. S. Naval Aircraft Factories.



BENCH
TYPE

HARVEY MFG. CORP.

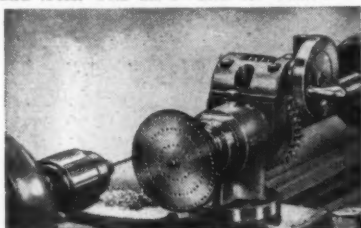
Dept. H, 161 Grand St., New York Phone: CAnal 6-5170

Jig Boring on Lathes!

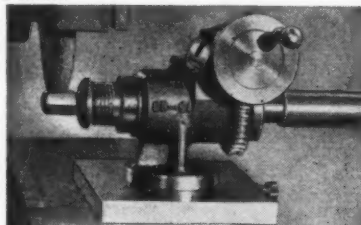


Handles work in the horizontal plane at any angle to lathe spindle.

You can now do jig boring with this revolutionary vertical rotary attachment—the DU-ONA-LATHE. Ordinarily possible only with jig-borer. Accurate to 1/10th of 1". Performs many jobs—drilling, reaming, flycutter facing and jig fixture work. Excellent as surface grinder to form triangles, hexagons or odd shaped punches and tools. Fits all 9" and 10" lathes.



Drilling accurately spaced hole patterns on a lathe.



Grinding hexagon punch from round bar stock on surface grinder.

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ALLAN MANUFACTURING CO.
22-78 Steinway St., Dept. B9, L.I.C. 5, N.Y.

the old method of free-hand grinding; furthermore, there is a definite saving in carbides.

Tools can be ground on the ends by tipping the vise on end and setting it on the other flat surface of the base. The device will work as efficiently as a vise or a jig.

The vise can be used economically on any grinder. By using channels, round tools of any size may be ground. The device is reasonably priced.

STEEL QUIZ

Answers to quiz on page 148

1. Gradually
2. Layer beneath scale
3. Approximate size
4. Slow
5. Softens
6. Cleaning
7. External depression
8. Removing seams
9. Brittle
10. Flat

CAMS

Our ROWBOTTOM cam cutting facilities are at your disposal for your cam requirements.

We solicit your inquiries.

BLOOMFIELD TOOL CORP.

38 FARRAND ST. BLOOMFIELD, N. J.

Plug Gages

Ring Gages

Adjustable Snap Gages

Centerless Lapping Machines

Pneumatic Hammers, (Chipping & Riveting) (Auto Body, sheet metal and Fender)

Hydraulic Jacks (Auto Service and Auto body)

Re-grinding and re-sizing of plug, Ring and Adjustable Snap Gages)

JAS. CLARK

139-149 17th Ave., Paterson 3, N. J.

GEAR CUTTING QUIZ

Answers to quiz on page 124

1. A multiple of teeth in the work
2. Remove less material
3. Shank type
4. Wider
5. Depth
6. Amount or pressure
7. Interrupted teeth
8. A single cutter
9. Prong
10. Two

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Six clear, easy to understand 35-mm silent slide film strips featuring: 1—What is Cemented Carbide? 2—Designing Single Point Cemented Carbide Tools. 3—Brazing Cemented Carbide Tools. 4—Designing and Grinding Chip Breakers. 5—Grinding Single Point Cemented Carbide Tools. 6—Applications and Trouble Shooting.

They are training films (not advertising). Available at approximate print cost. Complete set \$15 (f.o.b. Detroit). Singly, \$2.50; specify title. Included with each order: Instructor's Manual plus booklets of films. Send today for your films or free descriptive folder, GT-223.

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DEPARTMENT OF GENERAL ELECTRIC COMPANY

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Detroit 32, Michigan

William J. Thomas, general sales manager of The Babcock & Wilcox Tube Company, Beaver Fall, Pa., has been named to the Tubing Industry Advisory Committee which functions under the Office of Price Stabilization. Mr. Thomas has also been named to the Welded and Seamless Steel Tubing Industry Advisory Committee which functions under the Iron and Steel Division of the National Production Authority.

CERTIFIED

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THREAD GAGES

Plug—Ring—Roll Thread Snap Gages

Plain Plugs—Plain Limit Snap Gages

Discount —	50%—Plug Gages
	30%—Ring Gages
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All gages certified before shipment and sold subject to customer acceptance.

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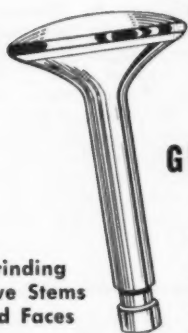
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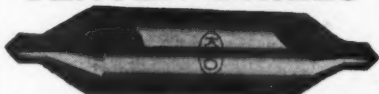
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business officials. Mr. J. P. Hughes Wasserman, father of Eutectic's president and founder, a pioneer of the welding industry for nearly fifty years, came from Switzerland to attend.

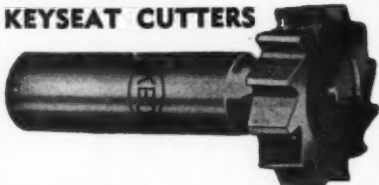
Among the guest speakers were Professor Otto H. Henry, of the Department of Metallurgy, Polytechnic Institute of Brooklyn, and Rene D. Wasserman, president of Eutectic. The latter, in his inaugural speech, called attention to the wide growth in recent years of the various welding processes, as well as

the constant improvements and applications which are being made by the use of welding throughout the industrial field.

Russell J. Cameron has been elected president of Ross Operating Valve Co., Detroit, succeeding **John Sainsbury**, who will remain as an active consultant and member of the Board of Directors. **W. E. Hennells** was named vice president and **L. M. Blomgren**, secretary and treasurer.

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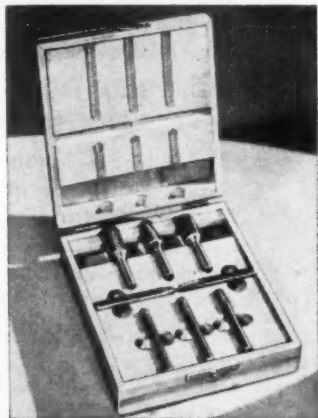
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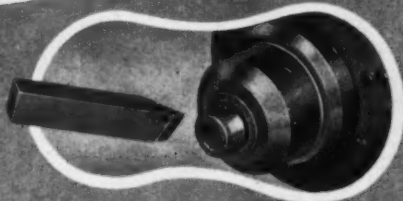


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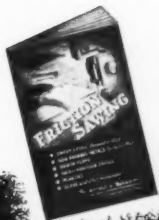
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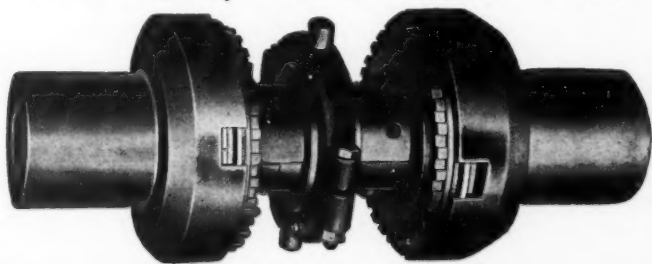
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17/64	12	9	2.05
9/32	12	9	2.05
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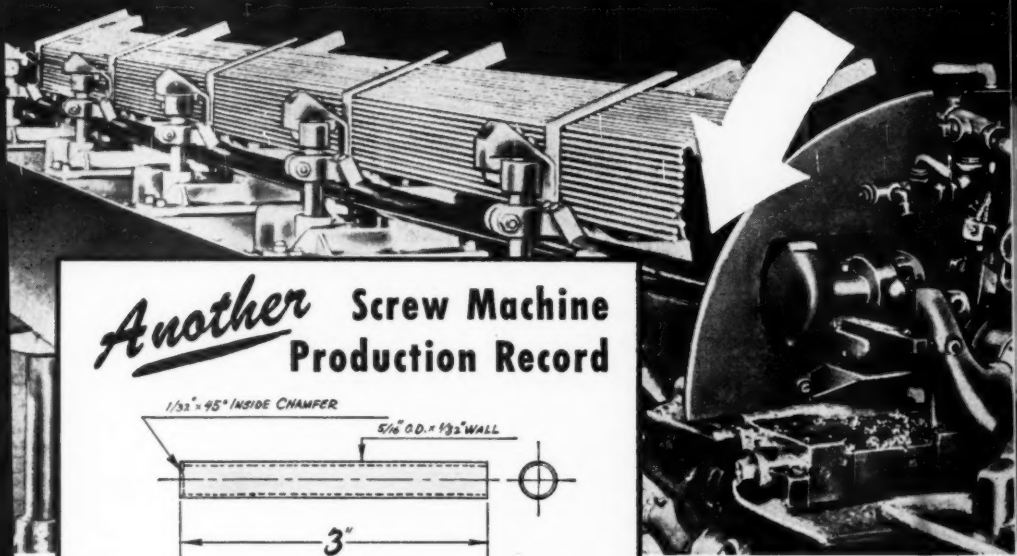
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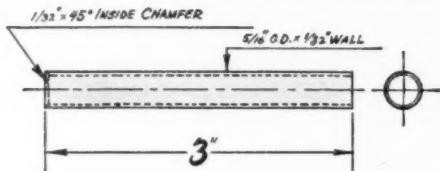
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Another Screw Machine Production Record



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THE CONCLUSION—In general machine shops with small, closely supervised screw machine departments, as well as in large multiple-machine production layouts, this fully automatic unit can cut cycle time . . . get *bigger production* . . . on a wide variety of work. The reasons why are in the opposite column:

- Stock is fed to screw machine all the time — not dependent on operator.
- Pressure constantly behind stock.
- Eliminates feed fingers.
- Avoids multiple feed finger feed-outs.
- Model AML gives maximum output of machine — no "cutting air".
- Saves in changeover set-up time.

Get full details on how this machine will increase production and save you money. It's today's big advancement in screw machine stock feeding. Our engineers will gladly study your problem; no obligation.



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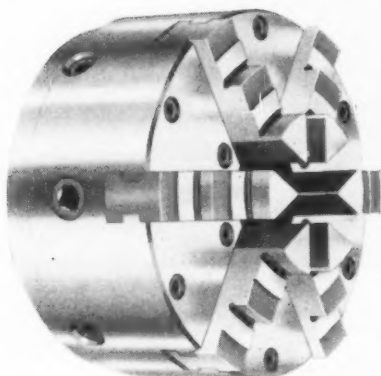
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with .0005 precision*

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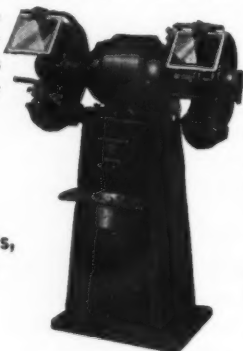


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... far faster than milling!**

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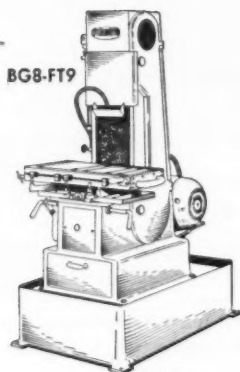
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
Division of THE R. K. LeBLOND MACHINE TOOL CO.

CINCINNATI 8, OHIO, U. S. A.




**Why
Allen  Head
Set Screws**


*Hold Better
Lock Better*

Locking is a matter of friction. High uniform accuracy of fit, pitch diameter and perfect thread lead assure maximum thread contact. Twelve and a half inches of thread provide one and one half square inches of contact in a $\frac{1}{2}$ " x $\frac{3}{4}$ " Allen  Head Set Screw.

The purpose of the point is to hold the shaft against both rotation and longitudinal motion. The Allen screw with the correct point* does the job best.



Improved heat treatment of Allen  Head screws produces greater Rockwell hardness and strength to permit firmer tightening. The Allen cup point grips the shaft without producing chips or particles. Ideal for use and re-use under vibrating stress conditions.

**Always the choice for the best
in precision screws . . . ALLEN  HEADS**



* Cup point for most applications. Cone, flat, half dog and oval points are standard Allen points available from stock for special requirements.



ALLEN 
MANUFACTURING COMPANY
Hartford 2, Connecticut, U. S. A.



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